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December 12, 1949

DEC 13 1949

STEEL

The Magazine of Metalworking and Metalproducing

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Ohio PROTECTO-WELD Magnets

MODERN welded-magnet design recognizes that steel mills give magnets particularly rough service. Ohio *Protecto-Weld* design places the weld *on top* where it is protected against damaging blows . . . where it cannot be dented in. Thus, you can disassemble an Ohio Protecto-Weld Magnet for periodic inspection without machining down the outer pole . . . without *replacing* outer pole.

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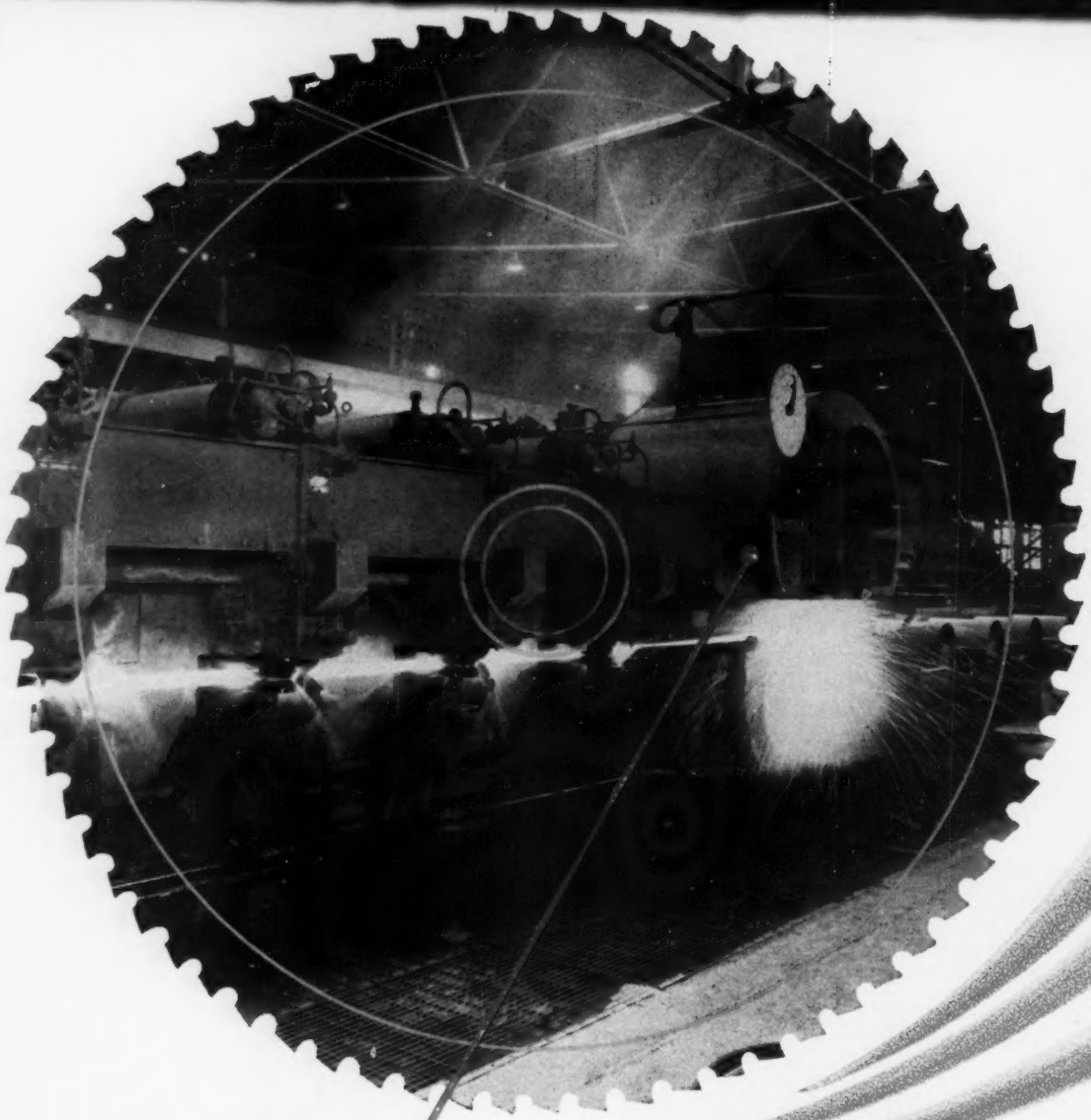

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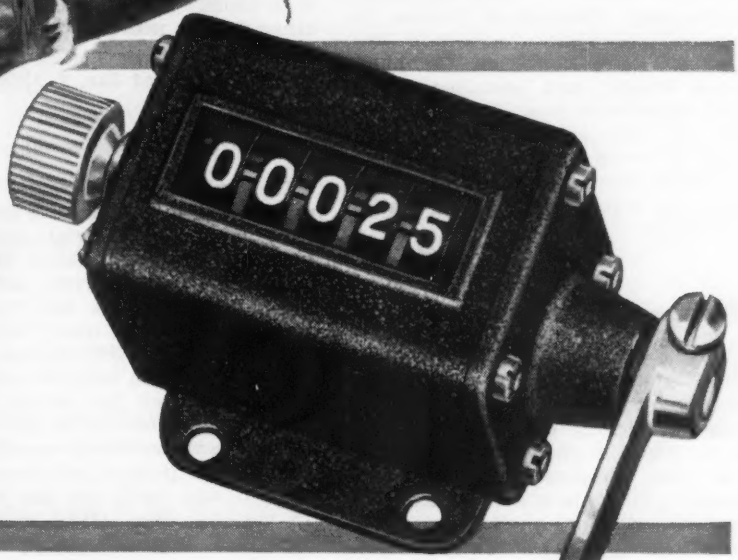

Why does he Count his chickens ...before they are "vaxed"?

"Now we've seen everything!" Every time we say that, we can count on it that someone will figure out a new way to use counters. There was the drink-dispenser, the Iron Chinaman, the map-making machine, the fishing reel, the ship's sextant, the exercise table, the bowling-pin setter and countless others.

Then came the egg-grader. So it was only a matter of time 'til another inventive mind combined a counter with a vaccinating device, to keep count of his birds as he needled them!

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Behind the Scenes...

Advertising 65 Years Ago

We were browsing in the archives the other day and came up with some interesting facts, besides a lot of dust. We happened upon a Dec. 13, 1884, copy of Iron Trade Review (that was STEEL's monicker until the early 1930s) and in that one issue put out just 65 years ago today, we discovered four advertisers who are still with us.

Of the some 50 other advertisers in the 1884 issue, all but two are no longer in business or have completely lost their identity through mergers and other corporate moves.

Six and a half decades ago Pickands, Mather & Co. inserted a chaste announcement that it was selling iron ore. William B. Pollack & Co. advertised steam boilers then. It sells its wide variety of steel mill equipment now. Babcock & Wilcox Co. also advertised steam boilers in 1884. Babcock & Wilcox Tube Co. publicizes welded and seamless tubing and refractories now. Hercules Powder Co. was offering dynamite for sale 65 years ago. Today DuPont, of which Hercules is a unit, advertises its metal cleaners and plating chemicals.

Preview of a Preview

We've just had a preview of STEEL's 1950 Metalworking Yearbook. Do you know how you feel when you casually pick up some general magazine, begin a good story, then find out that it's continued in the next issue? That's how we feel about the annual after a preliminary peek. We've got to wait until the issue date, Jan. 2, 1950, for the full story.

Outlined, the story will be this:

Our annual review and prospect analysis is a comprehensive study of what the metalworking industry can expect in the future about prices, labor, markets, raw material availability and all the other aspects of business which management must know. A chronology with pictures will give you the highlights of 1949. Our Detroit and Washington columns will appear with predictions of what to expect in those two capitals. The technical side will be treated in our annual forum on progress in metalworking. Subjects covered will be metallurgy, casting, forging, forming, joining, welding, inspection, testing, equipment, heat treating, surface treatment, lubrication, materials handling, metal production and machining.

The high spot of the highspots, though, will be our section on metalworking facts and figures. For 1950 we are greatly expanding our statistical package which met with such a fine reception in the 1949 annual. These statistics are designed as a permanent reference "must" for management. The grandaddy of these statistical summaries is the old *Penton Almanac* which came out in 1940 and was the first such compilation ever put out just for metalworking.

The 1950 facts and figures are selected statistics. We aren't counting the warts on the shipping clerk's hand. They are digested, analyzed statistics. Unreliable or meaningless indexes and other figures will be discarded before you have to bother with them. Pictographs, charts and other devices will interpret the mass of material.

(Continued Jan. 2, 1950)

He Clix Pix

Do you wonder where we get the pictures which appear with great frequency in the editorial section to the east of here? Some are from the companies involved; some are from photo services and free-lance photographers; but many come from the dark room of Dan Reebel, STEEL's photographer and associate editor. He has just moved his set-up to new and enlarged quarters in the editorial department's bailiwick upstairs. Dan can take a picture and have it developed and ready for the engraver 15 minutes later. He's equipped to take black and white or color photos anywhere because he's got a portable kit the size of a small suitcase which can hold all his paraphernalia. This apparatus includes a collapsible tripod, lighting equipment, a mechanism to assure synchronization of photoflash bulbs, a camera, wide-angle lens, exposure meter, film holders, film packs, adapters, flash bulbs, extension line and a tilt pan head.

Dan started his photography as a sideline when he was with Mesta Engineering Co. He used to take Mesta's color photos which have appeared on the front cover of this publication.

Shrdlu

(Editorial Index—page 47)

STEEL

Vol. 125—No. 24 December 12, 1949

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...EXT WEEK . . .

New Brass Strip Facilities Feature Continuous Casting

Weldable Stainless Clad Copper Offers Material Economies

Better Press Performance from Asymmetrical Deep Drawing

Transportation and Handling Of Iron Ore—II

STEEL

The Magazine of Metalworking and Metalproducing

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Editorial Index available semiannually; STEEL also is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18

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FOR DEPENDABLE LONG LIFE

insist on

Nickel Alloy Steel Gears

There are two kinds of nickel alloy steel gears . . . those that are carburized, and those that are direct hardened.

CARBURIZED GEARS

The carburized gear is used in applications that require maximum wear resistance in the surface, as well as greatest surface compressive strength. With nickel alloy carburizing steels, this goal is consistently attained, together with development of extremely tough cores that resist shock loads, fatigue and bending stresses. Moreover, a chief cause of noisy gears . . . the distortion that accompanies heat treating . . . is inherently resisted by nickel alloy carburizing steels.

DIRECT HARDENED GEARS

The direct hardened steel gear is used to carry heavy tooth loading in applications where resistance to wear and surface compressive stresses is not quite so vital a factor. Here again, the nickel-containing steels develop the required strength more consistently and in heavier sections than carbon steels, and are generally more resistant to shock, fatigue and multi-axial stresses. Distortion resulting from heat treatment may be minimized by using nickel alloy steels and their machinability before final heat treatment is very good.

Giving greater play to the skill of the engineer, nickel alloyed steels not only provide increased strength without sacrificing ductility, but they harden at lower temperatures which simplifies heat treatment and minimizes deformation and scaling.

MEET VARIED REQUIREMENTS

Nickel alloyed steels enable producers to meet virtually any reasonable requirements . . . whether dictated by revised stress analysis due to design changes, or by changed fabricating methods that demand better machining qualities or improved response to heat treatment.

MANY TYPES AVAILABLE

The many standard grades of nickel alloyed steels permit specifying the particular type which provides the best set of properties for any reasonable fabrication and service demands.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

December 12, 1949

The Cry Unheard

At the 54th annual meeting of the National Association of Manufacturers held in New York last week, its directors recommended a uniform manufacturers' excise tax on all end products except food and food products as a substitute for all present retail and miscellaneous excise taxes except those on liquor and tobacco. The directors also urged reduction of individual income taxes, elimination of double taxation of corporate income, a ceiling of not more than $33.6 billion on the federal budget for fiscal 1951, basic control of federal expenditures by Congress and return of the nation to a gold standard. They opposed the Brannan farm price support plan and creation by the government of any more "valley authorities." A number of eminent speakers at the meeting attacked the government's trend toward socialism.

We believe most informed persons in the country will approve in principle practically all of these recommendations. Nevertheless it is extremely doubtful whether NAM's stand on these national issues will make much of an impression upon public opinion generally or upon the thinking of members of Congress.

An important reason why NAM is not as potent as it should be was revealed in the remarks of two of NAM's prominent speakers. Lee H. Bristol, president of Bristol-Myers Co., referred to "management's pitiful and disastrous failure as politicians." Frederick C. Crawford, president of Thompson Products Inc., said "Americans are in danger of letting their wonderful way of life slip away from them because they are too busy to notice it" and added that his fellow Ohioans were so apathetic that only half of them voted in the last election.

Ohio voters have no monopoly on apathy. Not long ago John McCaffrey, president of International Harvester Co., reported that a check of 100 top business executives in the Chicago area showed that only 88 were registered and only 39 voted in the 1948 election. Throughout the United States, 49 per cent of those eligible to vote failed to cast their ballots in November, 1948.

If NAM seems to be a voice crying in the wilderness, it is not all NAM's fault. It is largely because millions, who probably think much as NAM's directors think, do not express their convictions on election day.

* * *

UNHERALDED PROGRESS: Included in the grist of news in this or any other issue are numerous items on plant additions and alterations. Recently we have noticed a substantial number of minor and moderate projects, involving expenditures of several hundred thousand dollars each, which were justified not so much by expansion of capacity as by greater flexibility or economy in manufacture.

For instance, a gas and diesel engine builder builds a $210,000 addition, not necessarily to increase capacity but to afford additional flexibility in operations. A steel warehouse company, in business for more than a century, will build a $750,000 warehouse and office building in the outskirts of its city to replace a downtown landmark which has become outmoded by traffic congestion. An important steel fabricator, an affiliate of a primary steel producer, is building an addition to its general office building in order to effect economies in several departments. A marketer of used machinery is moving into a new building where it will have electrical service which will permit it to operate

(OVER)

AS THE EDITOR VIEWS THE NEWS

any machine on the floor for the benefit of prospective customers.

Perhaps none of these improvements is startling or even noteworthy in itself, but in the aggregate they connote a steady movement toward increased efficiency of operation and a marked improvement in service to customers. This is the sort of private enterprise which makes for a stronger national economy. —p. 72

* * *

SMOOTH TRANSPORTATION: From our office windows, during the navigation season, it is not uncommon to see an automobile carrier come into the harbor from Lake Erie, proceed to its unloading dock, discharge its cargo of 400 to 500 shiny automobiles and start back to Detroit, all within a period of less than two hours. Meanwhile, probably we have witnessed the arrival of one or more ore carriers. Within less than an hour from the time they pass the Coast Guard station they are tied up at dock and the unloaders are at work.

Unless one actually witnesses these miracles of transportation, he will find it difficult to appreciate the importance of our Great Lakes and their superb fleets. Nowhere in the world is bulk freight carried as economically. If you are one who gets a thrill from superior service rendered under today's trying conditions, read "Transportation and Handling of Iron Ore" by P. L. Tietjen, president of Interstate Steamship Co. It is an epic on the world's smoothest transportation system. —p. 96

* * *

WITH THEIR BOOTS ON: Any student of human nature knows that many men who reach the nominal retirement age of 65 in good health do not relish the idea of being idle. They want to contribute in accordance with their abilities.

This attitude is illustrated strikingly by the enterprise of 14 former executives of International Harvester Co.—all over 60 years of age and all but one a pensioner—who have formed an informal group to serve as consultants for industry. Their service with IHC ranges from 20 to 48 years. Their experience covers a wide field, including plant equipment, layout and construction, product design, manufacture and inspection, traffic, purchasing, tax and accounting procedure and steel mill operation.

Just because pensions now seem to be a hot subject, do not jump to the conclusion that everybody is hell bent for early retirement. A goodly number of reliable workers in all wage and salary brackets prefer to die with their boots on. —p. 61

* * *

COATING UNDER VACUUM: New developments in metal coatings are being introduced so frequently that the layman is bewildered by their novelty and variety. One of the latest to command attention is coating by vacuum evaporation. The process involves three basic steps. First, an efficient pumping system creates a vacuum in a suitable working vessel. Secondly, a heating unit within this vessel raises the temperature of the coating metal to its evaporation temperature. Third, the work to be coated is exposed to the vapor of the coating metal.

Experience to date indicates that the process is best adapted to situations where a light film of deposited metal is desired. Until recently, most emphasis on vacuum coating was placed on batch methods. Now efforts are being made to use it in continuous methods of production. —p. 84

* * *

AN AUTO EVERY SECOND: A year ago forecasters were saying that the steel industry was entering its period of adjustment and that later on, probably sometime in 1949, the automobile industry would enter its inevitable period of adjustment.

In spite of scarcity of steel and some strike trouble, motordom is finishing out a remarkably good year. Some time this month the 20 millionth car built since V-J Day will roll off somebody's assembly line. The 20 million were produced in one year's less time than was required for 20 million prewar. Automobile Manufacturers Association calculates that during the first 10 months of this year, 52 new motor vehicles a minute, or nearly one a second, came off assembly lines every working day.

If the "inevitable" adjustment is near at hand, motordom is ignoring it. Automakers are planning heavy production schedules for January and February, with a strong likelihood that overtime operations will be ordered. The ambitious plans for first quarter are surprising suppliers—pleasantly. —p. 69

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

STEEL COSTS UP— Don't be surprised if you have to pay more for steel after the first of the year (p.55). Steelmen haven't made up their minds yet, but costs are higher than in August, 1948, when the last general price adjustments were made. Base steel quotations now are 52 per cent higher than the average for 1935-1939. Hourly steel employment costs have jumped 137 per cent, all retail commodity prices 87 per cent, cost of living 68.5 per cent, bituminous coal 79 per cent, freight rates 61 per cent.

PRICING DEADLOCK—Look for the White House or Congress to break the deadlock in the Federal Trade Commission over the steel delivered pricing case (p. 55). Commissioners Mead and Mason are for, Commissioners Carson and Ayres against a compromise. The steel industry wants to clear the case up. It would accept a consent decree.

MINERS' DEMANDS— It took six months after coal contract negotiations started for the operators to find out what John L. Lewis wants—15 cents a ton more in welfare royalties and a 95-cent daily wage increase (p. 57). Meanwhile the miners have lost nearly half their normal working time. The miners claim a few operators have acceded to their demands.

STEEL IMPORTS—Europeans may soon be trying to sell more steel in the U. S. (p. 59). Devaluation puts their prices in line with costs of domestic steel to many American seaboard users. Our tariffs offer only nominal protection to domestic producers. The tonnage still won't be large. It ran under 500,000 tons yearly before the war. In the first nine months of 1949, 370,000 tons were imported.

END-PRODUCT TAX—Getting gray hair over the chaotic retail and miscellaneous excise taxes which complicate bookkeeping and add to costs? National Association of Manufacturers (p. 60) presents a plan for one general end-product excise as a substitute for the confusing system of levies now in effect. This excise would apply to everything but food and food products. Present taxes on tobacco and liquor would be unchanged.

AUTOS—Automobile makers are putting on steam to build every car possible in January and February (p. 69). Suppliers are pleasantly surprised at this production drive which comes at a time when auto sales are normally slack. Automen probably reason that a touch of inflation in late 1950 may squeeze sales. They want to make hay while the sun shines.

FOREIGN—The French are optimistic about economic prospects for 1950, barring labor trouble, but gloom is heavy in Belgium-Luxemburg (pp. 66, 67). The French believe they're on an upswing in the business cycle; the Belgians are on the downtrend. The latter skimmed their cream early after the war . . . These articles continue a series on the economic pasts, presents and futures for major Western European nations. We write about Germany and Britain next week; a summary of the entire European situation will appear Dec. 26.

HERE AND THERE IN INDUSTRY—Scovill Mfg. Co. has built a cold-reducing brass sheet and strip mill with revolutionary features at Waterbury, Conn. (p. 58) . . . Fourteen former executives of International Harvester Co.—all of them over 60 and all but one a pensioner—have formed a consulting team to help industry (p. 61) . . . The Defense Department is seething with activity (p. 62) . . . Office of Small Business, ECA, will start issuing circulars telling of business opportunities (p. 64) . . . First U. S. trade fair will be held in Chicago Aug. 7-19, 1950 (p. 65) . . . U. S. consumers continue to go heavily into debt to buy goods—particularly automobiles—on the installment plan (p. 70) . . . . Cooper-Bessemer Corp. has built a flexible addition at Mt. Vernon, O., to solve the problem of erratic production activity (p. 72).

Inland Steel, too, Is Made to *Your* Specifications

• You can be just as specific as a small boy ordering a sundae . . . when you order steel from Inland. For, being completely integrated and having centralized facilities, Inland can produce the steel that will exactly fit *your* needs . . . and can act quickly when fast action is necessary. Furthermore, at Inland your steel orders . . . as well as your steel problems . . . are treated with friendly, personal interest. Your steel is checked and rechecked, step by step, through each phase of production. And, it is furnished to you "*job-fitted*" to your requirements.

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STEEL
A PENTON PUBLICATION

Pricing Deadlock

Federal Trade Commission in disagreement on compromise steel case settlement

BREAKING of the deadlock in the Federal Trade Commission over the steel industry's offer to accept a consent decree in settlement of the commission's action against the industry's former multiple-basing-point, delivered-price system may fall to the White House or Congress.

The deadlock arose when two of the FTC's top attorneys in the litigation disagreed over the action the commission should take. The divergent recommendations of the attorneys appear to reflect the attitudes of the commissioners themselves.

Attorneys Disagree—Lynn C. Paulson, trial attorney in the steel price case, wants the commissioners to accept the steel industry's proposal. Conversely, Richard P. Whiteley, chief trial counsel, holds that the commission lacks authority to dispose of the case on a consent basis without complete findings as to the facts supported by the evidence. Mr. Whiteley further says such disposition would be contrary to the public interest.

Commissioners Mead and Mason are reported to favor accepting the proposal, while Commissioners Carson and Ayres are opposed.

White House May Decide—One of two methods of breaking the deadlock would amount virtually to the deciding of the issue in the White House, since the deciding vote would be cast by the fifth commissioner, still to be named by the President subject to Senate confirmation. In that event the deciding vote would be cast by a "rightist" or a "leftist," depending on the type of man selected by the President.

Another course for ending the impasse would involve congressional action, possibly the decision which the Senate is slated to make on Jan. 20 on the House-passed O'Mahoney freight absorption bill.

Authority Questioned—When the commission gets ready to act it will have to make a decision as to whether, in its opinion, it has authority to accept a consent decree proposal devoid of findings. If it decides that it can take jurisdiction, it then will decide whether or not to accept the steel industry's proposal.

Meanwhile, respondents were given until Dec. 12 to file statements in support of their proposal or in reply to memoranda submitted by Messrs. Whiteley and Paulson.

Promise to Sell f.o.b. — A key provision in the steel industry's proposal for settling the suit is a promise by steel companies to sell on an f.o.b. mill basis to any customer who wants to buy that way. F.o.b. prices weren't generally available under the multiple basing point system. Mr. Paulson expresses belief the f.o.b. provision would help end the basing point system in the steel industry.

In return, the FTC would agree that the steel companies could absorb freight charges under certain conditions.

Freight Books Out—In addition to agreeing to offer f.o.b. mill prices the companies would promise not to co-operate in compiling freight tariff books or lists of freight rates for use in pricing of steel products and not to agree with one another on the base prices at which steel shall be sold or upon extras to be added to or deductions to be made from base prices.

The steel companies specifically assert in the proposal that they are not admitting any of the government's charges are true. The FTC would make no findings of fact as to industry practices beyond the statements that the companies are engaged in interstate commerce and that they compete with each other in the steel market.

Steel Going Up?

Producers study costs. What they see indicates higher prices. But demand is uncertain

YOU may have to pay more for steel after the first of the year.

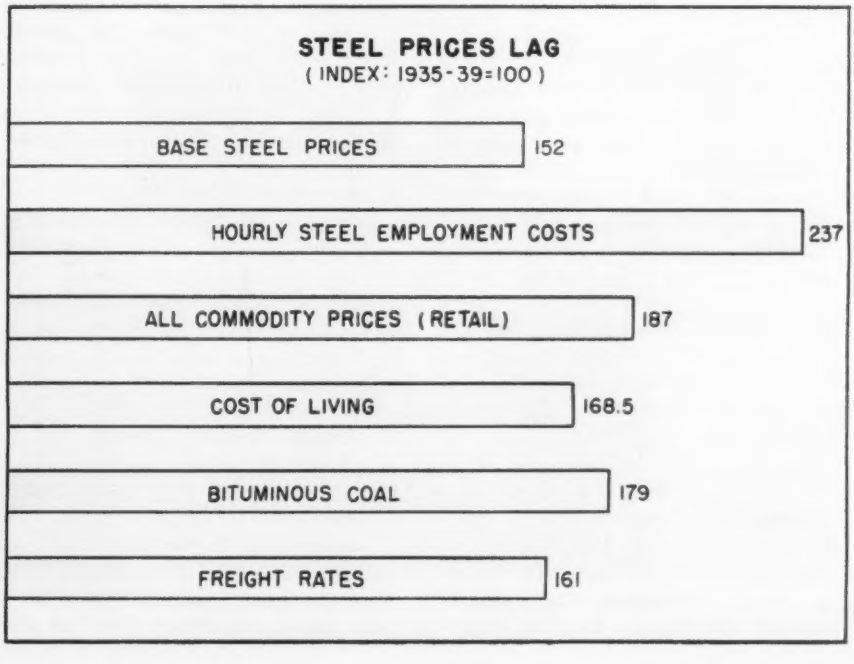
The big steel producers haven't made up their minds yet. But they are studying steelmaking costs. And costs are substantially higher than in August, 1948, when last general price adjustments were made.

Steel men think their product is under-priced—on the basis of costs and in relation to other commodity prices. They point out that costs and prices of most other goods have advanced considerably more than steel prices (see chart). They are rather proud of their restraint in pricing steel. But they believe the time is near when some adjustments must be made.

Some Prices Advanced—Over the past ten weeks, at least ten companies have made upward revisions in prices. These are small companies. Many of the advances have been on specialty items, although plates, hot-rolled strip, semifinished and galvanized sheets are included. The total tonnage affected by the increases is small.

Metalworking executives are now watching for price action by the larger producers.

Morrell Hints Increase—Ben More-



ell, chairman and president of Jones & Laughlin, gives a hint of what to expect:

"Unless there is a sharp reversal of the current trend of cost increases, we must have an upward revision of our steel price structure."

Admiral Moreell says the form the revision should take, the products to which it will apply, and the amount of the increase should be determined only after "most careful study of costs and the present and prospective demand for our products."

Future Demand Uncertain—Steel men agree that advancing costs justify a price increase. They are not so certain about demand after the first quarter of next year. Some are bullish. Others look for a drop in the spring.

This is causing the hesitancy.

Should producers decide to advance prices, the adjustment probably will be made on a product basis rather than across the board.

Pensions Boost Cost—Largest cost-increasing factor is the social security packages granted the union at the end of the steel strike. Pensions and social insurance costs will vary from company to company. Few producers know yet just what they will be. Estimates for the industry are around 12½ cents an hour.

Hourly employment costs (wages plus fringe benefits) have increased at least 137 per cent over prewar.

Freight rate increases have averaged more than 57 per cent since the end of the war. This bulks large in the steel industry where several tons of raw materials must be assembled to make a ton of steel.

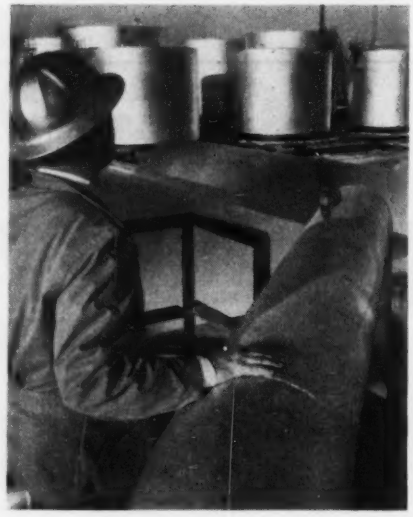
Iron ore prices in the past year were advanced $1 a ton. Vessel rates advanced 10 cents. Rail freight rates increases also apply here.

Coal prices have remained fairly steady in recent months, although delivered prices are boosted by the higher freight rates. Many producers complain that the quality of coal is declining. This means either that costs are increased by coal preparation or by operational difficulties arising from use of a poorer grade coal.

November Construction High

New construction worth more than $1.7 billion went into place in November, says the Labor and Commerce Departments.

The November total was down 8 per cent from the October estimate, but was still 6 per cent more than the November, 1948, level. Good construction activity so late in the building season buttressed the national economy last month. Building of retail stores, offices and schools actually rose a little in November, contrary to the seasonal downtrend.



TANK FARM: Cit-Con Oil Corp. engineer surveys field of tanks with a capacity of 1,700,000 bbl in the lubricating oil refinery at Lake Charles, La. The $42 million plant takes the "heart cut" from lubricating fraction of crude oil to make automotive and industrial lubricating oils. Plant is owned jointly by Cities Service Co. and Continental Oil Co.

A record year in terms of dollars spent for new construction is nearly assured for 1949. The 11-month total stands at $17.7 billion. New construction was valued at $19,250 million last year. Private construction is lagging by 5 per cent, but public agencies are spending 25 per cent more for new building this year.

Private nonfarm homebuilding in November was worth $700 million, 3 per cent less than the October estimate, but 14 per cent more than the November, 1948, figure. Building activity on most types of private nonresidential structures in November equalled or exceeded October levels in contrast to seasonal declines usually expected at this time of year.

Magnavox Sales Good

Magnavox Co. has an order backlog of $7 million. Sales in the year ended last Feb. 28 totaled $24 million. The Ft. Wayne, Ind., company says shipments have trailed demand since early fall. It makes radio and television sets.

Railroad To Buy Diesels

A railroad that started as a trolley line is buying a fleet of diesel-electric locomotives.

Youngstown & Southern Railroad will purchase five switcher-type 1000 hp units costing about $600,000. They will replace its entire fleet of five steam and three electric locomotives.

Y & S started as an electric interurban line. Twenty years ago Pittsburgh Coal Co. bought it and the Pittsburgh, Lisbon & Western Road. A 14-mile rail line between Smith's Ferry, Pa., and Negley, O., was added to the system to make it an Ohio river-Youngstown coal route. Its corporate structure has changed, but Y & S still is a coal line. It has been using steam to Willow Crest, just south of Youngstown. Electric locomotives fed by the overhead trolley system of the interurban era run between Willow Crest and Youngstown.

National Steel Car To Cut

Lack of orders will force a partial shutdown of National Steel Car Corp.'s plant in Hamilton, Ont., before the yearend, says R. S. Hart, president. Recently, 200 employees were laid off with a closing of the steel preparation and erection departments. After January, a new baggage car order will provide work for 500 for two months.

Fairchild Backlog Soars

Fairchild Engine & Airplane Co. has an order backlog of $90 million as a result of $20 million in new orders received by the Aircraft Division.

This is "the best position since the end of the war," says Richard S. Boutelle, president.

Youngstown Employment Up

There's unemployment in the Youngstown area—in contrast to a year ago when management had to recruit outside labor—but the situation is improving.

Fabricators that curtailed or shutdown during the steel strike are building up steam again. One such is Briggs Mfg. Co. which will boost employment to 400 by yearend at its new Youngstown plant. This payroll level would have been reached much earlier had there been no steel walkouts.

Briggs early this year took over the Carnegie-Illinois Steel Corp.'s old Upper Union Mill, and spent $1.4 million to buy it and prepare it. Youngstown was picked as a site to save freight charges. Originally planned only as a blanking plant, the facilities have been expanded for some auto body assemblies like deck lids and fenders.

Shipbuilders Back at Work

Shipbuilders are regaining the momentum they lost during the steel strike.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has re-

called 200 workers to resume work on the superliner for the U. S. Lines. The laying of the keel originally scheduled for December is delayed until early 1950.

Welding Shipyards Inc., Norfolk, Va., has recalled 200 of 400 employees idled by the steel tieup. Work on a tanker which was delayed now is proceeding.

Investment Thaw Sought

So many thrifty Americans are refusing to risk their savings in business investments that Congress is looking for the reason.

Sen. Joseph C. O'Mahoney, (Dem., Wyo.) says a Senate-House economic subcommittee is digging into the problem in a series of public hearings. The committee seeks to find whether Congress should step in with legislation to encourage more direct investments in business. Senator O'Mahoney says that "many business executives are beginning to wonder if it would not be better for them to distribute more profits." Congress could encourage greater distribution by higher taxes on undistributed business profits.

November Employment Up

Total civilian employment in November recovered the losses stemming from the steel and coal strikes. Secretary of Commerce Charles Sawyer says "the job picture in November was more favorable than at any previous time this year."

Census Bureau figures show total employment at 59,518,000 in the week ended Nov. 12, compared with 59 million in the week ended Oct. 8. The normal holiday season upswing in employment started in early November. Unemployment, 3,409,000 in November, failed to show the full effects of those gains because of an increase in the number of seasonal workers looking for jobs. October unemployment stood at 3,576,000.

Nonagricultural employment, at 51,640,000 in November, was 350,000 above October, and was back to the 1949 high set in the late summer. Estimated at 7,878,000 in November, agricultural employment was relatively unchanged from the October level, 7,710,000.

About 1.5 million persons with full-time jobs were working part time in the November survey week because of slack work, material shortages, and job turnover. Also in the month, 1 million persons with regular part-time jobs preferred and could have accepted full-time employment. Total civilian labor force was 62.9 million in November, compared with 62.6 million in October and 61.8 million in November, 1948.

Lewis Reveals Demands

Asks for 15-cent royalty hike to support tottering miners' welfare fund

SIX months after negotiation for renewal of coal mining contracts started, John L. Lewis reveals the miners' demands: A 15-cent hike in the tonnage royalty to support the miners' welfare fund and a 95-cent daily wage increase.

While Mr. Lewis says he is denting the resistance to his demands by signing up small groups of operators, the majority of operators retort that their resistance is "more solid than it ever has been." "Just gopher holes" is the big operators' description of the unspecified small mines which the miners' chieftain claims to have signed.

Most coal mines are operating only three days a week. The mine leader still faces a coal supply that would last about 45 days if he took his men out altogether.

Would Raise Royalty to 35 Cents—The Lewis demands would increase the welfare royalty to 35 cents per ton of coal mined and would increase miners' wages to a $15-a-day base.

The proposed welfare collections, if granted by the entire industry, would yield an estimated $175 million annually. Out of this, Mr. Lewis proposes to pay $100 monthly pensions and other benefits to miners aged 60 with 20 years of service.

Fund Depleted—Payments from the welfare fund were suspended last summer when an excess of payments over income depleted the fund.

Actuaries doubt that even 35 cents a ton would support the welfare fund on the basis under which it was being administered.

Alcoa Employees Back at Work

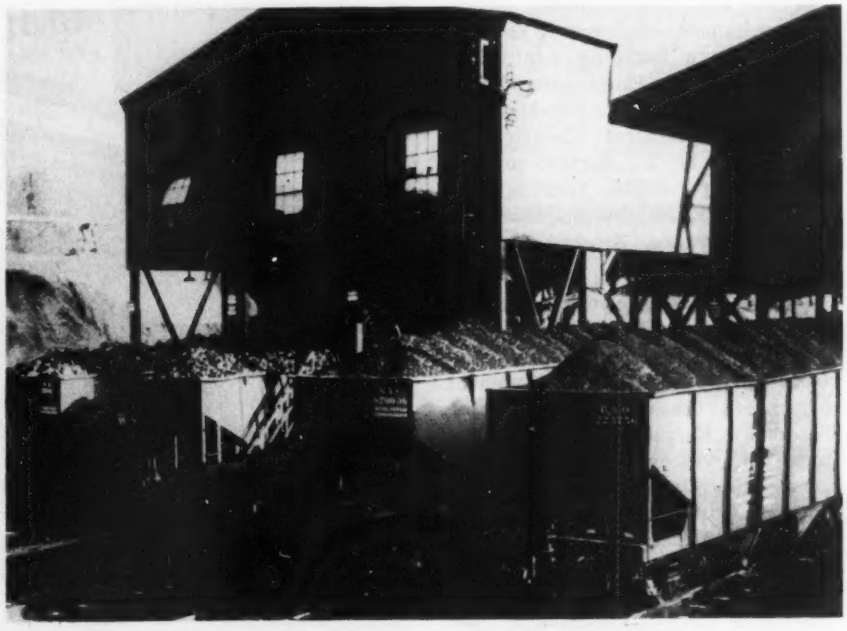
Seventeen thousand workers in nine Aluminum Co. of America plants are back at work following a seven-week strike. The union, the United Steelworkers-CIO, gave in on demands for a wage increase and extra pay for holidays not worked and accepted the company's offer of noncontributory pensions and increased social insurance benefits.

Minimum pensions of $100 a month, including social security, are provided for workers retiring at 65 with 25 years of service. A disability clause provides minimum payments of $50 a month for permanent disability under certain conditions of employment.

Social insurance benefits include: 1. $2000 group life insurance during employees' active service; 2. $1500 death benefit for retired employees; 3. sickness and accident benefits of $26 for 26 weeks; 4. hospitalization benefits of $8.50 a day plus $85 for miscellaneous hospital expense; and 5. surgical benefits up to $225.

L & N Furloughs 1000

Louisville & Nashville Railroad laid off about 1000 trainmen last week. The furloughing was caused by plans of United Mine Workers to work only three days a week. Layoffs apply principally to areas in the Harlan and Hazard coal fields of eastern Kentucky and mining areas in eastern Tennessee.



COAL PRODUCTION AT THREE-DAY TEMPO
. . . but industrial supplies continue comfortable

New Brass Mill Built

By Scovill Mfg. Co. at Waterbury, Conn., to produce sheet and strip. Cost is $10 million

SCOVILL MFG. CO. has just placed in operation its new $10 million continuous brass strip mill for production of the heaviest cold-rolled, nonwelded brass coils available today. In the past few years, fabricators have been asking for both heavier steel and nonferrous coils to reduce machine down-time.

Casting Machine Is Pulse—Pulse of the mill—and the whole plant—is the casting machine. It's supplied with metal from three electric induction furnaces, each with capacity of 10,000 pounds per hour. The casting unit has a capacity of several million pounds per week. At staggered intervals, melting furnaces discharge into a holding furnace with a capacity of 9000 pounds mounted over the casting machine which produces flat bars, 2½ in. by 24 in. by 10 ft and weighing more than a ton.

Several brass mills and one steelmaker have continuous billet casting machines but Scovill is first with a machine for making wide, flat bars. Scovill now is continuously casting 70-30 cartridge brass, 95 per cent gilding metal, 90 per cent commercial bronze, 85 per cent red brass, 65 per cent yellow brass and expects to add other alloys later.

Suppliers of Mill Equipment—Suppliers of equipment for the new mill include: Melting furnaces, Ajax Engineering Corp., Trenton, N. J.; two-high breakdown mill, the largest used by nonferrous producers, Farrel-Birmingham Co. Inc., Ansonia, Conn.; mill development-engineering and flat metal vacuum handling equipment, Stone & Webster Engineering Corp., Boston; controls on the two-high mill and slitters, General Electric Co., Schenectady, N. Y.; electric controls on four-high mills, Westinghouse Electric Corp., Pittsburgh; short bar annealing furnace, Electric Furnace Co., Salem, O.

Bar and coil conveyor system, Mathews Conveyer Co., Ellwood City, Pa.; coil handling conveyor system, Logan Co., Louisville; equipment to process brass strip and sheet, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; four-high mills, United Engineering & Foundry Co., Pittsburgh; annealing furnaces and facilities, Surface Combustion Corp., Toledo, O.; continuous spray pickling machines, Metalwash Machinery Corp., Irvington, N. J.

STEEL will carry a detailed description of this mill Dec. 19.

This old hand mill could produce only 1 ton of cold strip steel an hour . . .

Another Hand Mill Bows to Continuous Unit

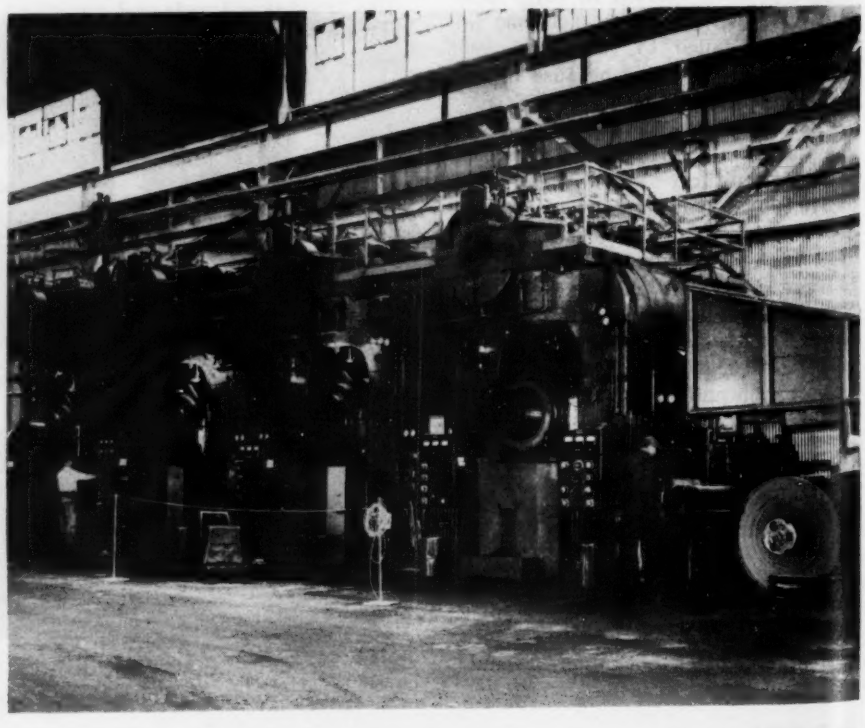
MORE THAN 150 interested spectators from New York, Pittsburgh, Chicago, Detroit and the St. Louis area saw the new mill installations at Granite City Steel Co., Granite City, Ill.

The company closed its last old hand mill in a ceremony Nov. 30 and saluted completion of its 15-year, $20 million modernization program (STEEL, Dec. 5, p. 67).

Three members of the old hand mill crew (see top cut) with Mayor Joseph M. Darst of St. Louis (center), John N. Marshall, board chairman of Granite City Steel, and Mayor Leonard Davis of Granite City (far right) inspected the last sheet of steel coming from the old mill.

The new $8 million tandem continuous cold strip mill (see bottom cut) replaces the hand mills.

. . . but this new $8 million tandem continuous mill can produce 50 tons



For Sale: Foreign Steel

Devaluation may spur imports of European steel into U. S. Seaboard firms likely users

FOR SALE: Austrian pig iron at $46.45 per ton, c.i.f. New York or Boston.

That offer or something like it promises to be heard more often in this country over the months ahead. It may be listened to more frequently, also, because the price is attractive. Basic domestic pig iron delivered in Boston brings $55.26 per ton.

These factors will tend to boost iron and steel imports:

Foreign prices on many products are competitive with domestic costs to seaboard consumers now that European currencies have been devalued.

European producers seek new markets to fill up their idle capacities.

Even if their home demand were still strong, every country in Western Europe would try for the American dollar regardless of the strain on domestic steel supplies.

American import duties on iron and steel products are nominal.

Imports Still Small—In the accompanying summary of steel exports and imports, you can see that imports are still small. In relation to total U.S. domestic steel ingot production, iron and steel imports this year are running at only about 0.6 per cent. In 1939 imports were 0.7 per cent of domestic ingot production; 0.9 per cent in 1937. Prewar ratio is not likely to be exceeded, but total tonnage could be topped. In the first nine months of this year about 370,000 tons were imported. In 1937, a heavy import year, the U.S. took in 452,000 tons.

Foreign prices are such that American seaboard consumers are the most logical customers. New England is a market for some foreign pig iron. All Europeans would like to sell semifinished here, but prospects are poor unless an unforeseen steel shortage develops. Offers for finished steel will become more numerous, particularly from Belgium-Luxemburg, France and Britain. The French will have some excess finishing capacity by the end of 1952. The British could sell all their finished outside the U.S., but they will try to divert a little. Belux has excess plate and structural capacity. There's a fair market here for specialty tool and alloy grades, such as produced by Sweden. Western Germany is no factor in the import market because her production and foreign shipments are limited by the Allies.

Import Duties Nominal—Import duties on iron and steel products offer negligible protection to domestic producers, says American Iron & Steel Institute. On 14 important products, ranging from pig iron to nails, present duties average only 7 per cent of market value, or less than half as much as in 1930 when the average was 19 per cent.

Steel Exports, Imports Gain

BOTH exports and imports of iron and steel gained in September over the August totals. Exports rose to 477,660 tons from 463,770 in August and September's imports were 11,659 tons, compared with 6437 tons a month earlier. Commerce Department totals show exports and imports for the first nine months to be 3,986,093 tons and 228,645 tons, respectively.

Increased shipments in three categories, sheets and plates, structural shapes and railroad supplies, accounted for the increase in September's export total. Scrap exports continued to fall to 25,638 tons in September from 29,104 tons in August.

Ingot imports in September rose to 9969 tons from 5045 tons and accounted for most of the gain from the preceding month's total. Only minor changes were recorded in the remaining categories and no other import classification reached 1000 tons. Scrap imports continued their sharp drop to 5618 tons in September, well below the August total of 43,207 tons.

September and nine-months exports by principal categories were:

(Net Tons)

	September	9 Months
Semifinished	51,859	382,829
Iron and steel bars	36,146	407,564
Sheet and plates	194,272	1,530,331
Structural shapes	41,951	404,234
Railroad supplies	36,874	268,383
Tubes, pipe, fittings	85,798	688,497
Wire products	26,558	251,799
Nails, other fasteners	4,222	52,456
Total	477,660	3,986,093
Pig iron, ferroalloys	1,153	85,753
Scrap	25,638	441,491

Commerce Department's breakdown of imports for September and the first three-quarters is:

(Net Tons)

	September	9 Months
Ingots, etc.	9,969	41,077
Wire rods	314	3,283
Iron bars, slabs	23	356
Reinforcing bars	....	4,417
Hollow bar, drill steel	....	35
Other bars	51	17,875
Boiler, other plate	9	24,067
Sheets, etc.	3	8,608
Tin plate, etc.	22	60
Other hoops, bands	1	5,310
Structurals, pilings	815	112,765
Rails, fastenings	....	996
Wheels, axles	1	69
Pipe, tubes	34	5,284
Round wire	2	20
Flat wire, strip	103	1,350
Telegraph wire	102	457
Wire rope	156	561
Nails, etc.	25	1,271
Bolts, nuts, rivets	3	51
Castings, forgings	22	82
Die blocks, blanks	4	652
Total	11,659	228,645
Pig iron	....	77,735
Sponge iron	386	2,191
Ferromanganese	1,130	50,683
Ferrosilicon	65	717
Ferrochrome	271	2,524
Scrap	5,618	1,033,246

No Rush, No Crush

CHRISTMAS shopping crushes and traffic jams would be something New Yorkers could recount to their grandchildren if Vice President Harold Von Thaden of Hewitt-Robins had his way.

Speaking to the American Society of Mechanical Engineers, he suggested mechanical belt conveyors below Manhattan streets to handle people and cargo. They would rid the city of at least 25 per cent of truck traffic congestion that congests midtown. "One of the greatest bugaboos of modern transportation systems is the confusion that springs up at terminals when passengers, baggage and freight move on and off trains, ships, planes and busses," he said.

"Should the utilization of low-grade taconite ore be developed, the only feasible means of handling the vast quantities of ore needed is the belt conveyor," he pointed out.

Devaluation Hits Stove Exports

EXPORT business in stoves turned down with devaluation of the British pound, delegates heard at the Cincinnati convention of the Institute of Cooking & Heating Appliance Manufacturers. Institute president is A. B. Ritzenthaler, vice president of Tappan Stove Co., Mansfield, O.

New Scrap Firm Formed

ROBERTS Steel Corp. has been formed as a broker in scrap iron and steel. Its offices are at 2922 Grant Bldg., Pittsburgh. President is D. L. Wilkoff of David L. Wilkoff Co., Pittsburgh.

Alan Wood Strip Mill Finished

CONSTRUCTION of Alan Wood Steel Co.'s new $9 million hot-rolled strip mill at Conshohocken, Pa., has been completed. Work of installing accessory equipment is under way.

The new mill will be in operation early in 1950. It's the first of its kind in eastern Pennsylvania.

NAM Proposes New Uniform Excise Tax

It would be on most factory end products and would be substitute for chaotic retail, miscellaneous levies. Idea presented at industry congress in New York

BUSINESSMEN are proposing a new tax. It is a uniform manufacturers' excise on all end products. It is proposed by directors of the National Association of Manufacturers and was presented to the 3000 attending NAM's annual congress of American industry last week in New York. Food and food products would be exempt from the levy which would be a substitute for all retail and miscellaneous excises except those on liquor and tobacco. Those would be unchanged.

Chaos in Taxes — The idea is to bring tax order to a chaos which hampers industry more and more. A uniform levy would lighten the bookkeeping load needed to keep up with all the present retail and miscellaneous taxes. It would cut manufacturers' costs. It would equalize competition geographically by equalizing taxes.

The directors don't mention a specific rate, but it should be "sufficient to produce the same amount of revenue—about $4 billion—as is now produced by the excises for which it would substitute."

Other fiscal recommendations are: Reduction in individual income taxes; elimination of double taxation of corporate income; a federal budget ceiling for fiscal 1951 not in excess of $33.6 billion; and basic control by Congress over federal expenditures. The directors urge a return by the United States to a gold standard. They oppose the Brannan farm price support plan and government's creation of any more valley authorities.

Welfare State Attacked—Speakers at the congress criticized the welfare state and urged the nation's economic leaders to take an active part in public affairs. Lee H. Bristol, president of Bristol-Myers Co., told the businessmen to sell themselves to their employees. If employees aren't sold by management, they will become prey to "political bunk that solves none of their problems and robs them of everything they hold dear." He added: "The public is unwittingly being hoodwinked into sowing the seeds of its own destruction" by management's pitiful and disastrous failure as politicians.

Ralph W. Carney, vice president of Coleman Co., Wichita, Kans., called the present welfare trend "the dead hand of security" throttling opportunity.

ERP Success Vital—ECA Administrator Paul G. Hoffman warned that the Marshall Plan must succeed or the United States will become a garrison state.

Curtis E. Calder, chairman of Electric Bond & Share Co., said business must prepare now for the end of the European Recovery program in 1952. He said the nation's export-import picture must be put into balance or the billions of dollars spent on foreign aid will be money down a rat hole.

State Taxes Hit Business

States' tax receipts from business are skyrocketing. The corporation income tax provided states with more than $600 million in fiscal 1949—326 per cent more than in 1940. These are conclusions made in an analysis by the National Industrial Conference Board.

Business taxes amounted to 18.1 per cent of total state tax collections (excluding unemployment compensation) in 1948 and 19.1 per cent in 1949. In 1941 these taxes accounted for about 14.5 per cent of state collections.

Business taxes supplied 35.5 per cent of the 1948 tax receipts (excluding unemployment compensation) in Texas. New York, New Jersey and Pennsylvania had the highest business tax collections in 1948. Although the corporate income tax is the largest source of business tax revenue for most states, other taxes are: Taxes measured by adjusted gross premiums of insurance companies; taxes measured by gross receipts or other standards of public utilities; license and privilege taxes upon corporations; chain store levies; and severance taxes. Excluded from the conference board study are property, sales and use taxes and certain license and privilege taxes.

All state and local taxes totaled $14.4 billion in 1948, a rise of almost $5 billion since 1942. All state taxes alone accounted for $7.8 billion in 1948 and $8.3 billion in fiscal 1949. Louisiana had the highest per capita taxes in fiscal 1949, $92.19, followed by Washington with $90.07 and California with $83.41. New York's per capita tax collections came to $62.72.

Despite increased revenues gross state debt outstanding rose to $3.6 billion in 1948.

Material Handlers Elect Officers

J. H. W. CONKLIN, Clark Tructractor Division, Clark Equipment Co., Battle Creek, Mich., was re-elected president of the Material Handling Institute Inc., at its fifth annual meeting at the Commodore Hotel, New York, Dec. 6.

John G. Bucuss, Acme Steel Co., Chicago, was re-elected first vice president, and L. West Shea, the Union Metal Mfg. Co., Canton, O., was newly elected second vice president.

Members of the various product sections met to elect their officers. Chairmen and vice chairmen they picked to serve on the board of directors for 1950 are:

Casters—W. H. Noelting, Faultless Caster Corp.; C. M. Mead, Divine Brothers Co.

Electric Accessories—C. B. Elledge, General Electric Co.; C. J. Moore, Electric Storage Battery Co.

Electric Hoists—J. C. Mevius, American Engineering Co.; H. H. Kumler, Euclid Crane & Hoist Co.

Electric Industrial Trucks—L. J. Kline, Mercury Mfg. Co.; W. A. Meddick, Elwell-Parker Electric Co.

Floor Trucks—C. H. Strauss, Ironbound Box & Lumber Co.; E. C. Hamm, Service Caster & Truck Corp.

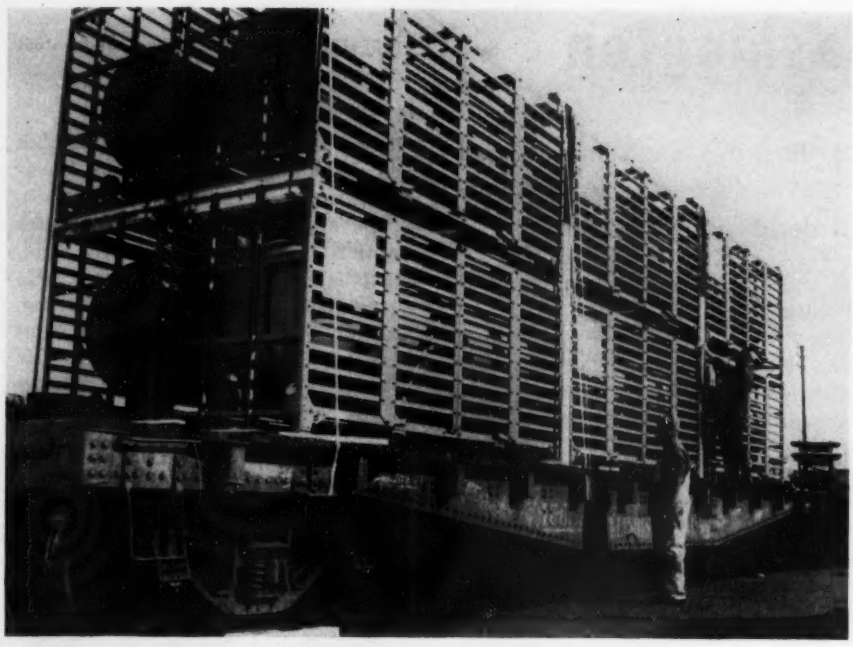
Gas Trucks—J. W. Wunsch, Silent Hoist & Crane Co.; C. E. Smith, Towmotor Corp.

Hand Lift Trucks—Geo. G. Raymond, Lyon-Raymond Corp.; W. C. Stuebing, Lift Trucks Inc.

Monorails and Tramrails—J. P. Lawrence, American MonoRail Co.; E. R. Ransom, Richards-Wilcox Mfg. Co.

Motorized Lift Trucks—Howard M.

J. H. W. CONKLIN
. . . elected MHI president



SHIPPING SHELLS: Here is the first carload lot shipment of 12 jet aircraft engine containers, made by Firestone Tire & Rubber Co. The rubber-cushioned aluminum alloy shipping shells protect the intricate engines from damage by jars and jolts and are pressurized to prevent corrosive effects of humid air

Palmer, Lewis-Shepard Products Inc.; I. F. Schreck, Moto-Truc Co.

Pallets, Containers and Auxiliary Equipment—G. J. Hanhauser, Fab-Weld Corp.; R. J. Himmelright, Monarch Rubber Co.

Strapping—H. C. Bristoll, the Stanley Works; Adolf Larsen, Gerrard Steel Strapping Co.

The conveyor product section will ballot by mail for its chairman and vice chairman.

Announcement was made that the fourth National Exposition of the institute will be held in Chicago, Apr. 30-May 4, 1951. The last exposition was held in Philadelphia last January.

The institute will hold its next semiannual meeting, jointly with the Electric Industrial Truck Association, at the Greenbrier, White Sulphur Springs, W. Va., June 15-17, 1950.

Republic Lights New Open Hearth

REPUBLIC Steel Corp. has put a new open-hearth furnace—No. 15—into production at its Cleveland district plant.

The furnace will supplement production from Republic's 14 older open hearths and provide an estimated 120,000 tons of steel per year.

The furnace, which will tap 200 tons per heat, was designed by Republic engineers and erected by Hunkin-Conkey Construction Co. and McDowell Co. Inc. The present open-hearth building was extended 127 ft to accommodate the new unit.

Follansbee To Sell Ohio Plant

FOLLANSBEE Steel Corp., Pittsburgh, has offered its Toronto, O., plant for sale. Plant includes four 50-ton basic oil-fired open hearths rated at 136,080 net tons annually; two-high one-stand 8-inch reversing billet mill for output of about 124,800 net tons of sheet bars annually; one rocker arm pickling machine, 1000-ton United Engineering press for cogging ingots; 16 standard box annealing furnaces; plus coal and clay property. Proposed sale will not affect company's ability to serve its customers as in the past.

Steelmaking Library Dedicated

A LIBRARY for the advancement of steelmaking—open to scientists the world over and to the general public—was dedicated in Bethlehem, Pa., last week to the memory of Charles M. Schwab.

It is called the Charles M. Schwab Memorial Library.

Every leading steel company sent top officials to the ceremony at the general offices of Bethlehem Steel Co. The American Iron & Steel Institute devoted its December directors' meeting to the occasion. It was 70 years after Mr. Schwab's first employment in the steel industry.

E. G. Grace, chairman of Bethlehem, Benjamin F. Fairless, president of United States Steel Corp. and Walter S. Tower of the institute were the speakers. They paid tribute to Mr. Schwab as founder of Bethlehem, first president of U. S. Steel and a leader in the steel industry.

The library presents a unique arrangement for scientists concentrating on metallurgy.

Life Begins Again—After 60—for Pensioners

OLDTIMERS can teach new tricks—maybe to you. That's the goal of 14 former executives of International Harvester Co.—all over 60 years old and all but one a pensioner—who have formed an informal group to act as consultants for industry.

These 14 believe that business life need not end at the pension age. They offer consultative services in plant equipment, layout and construction; product design, manufacture and inspection; traffic; purchasing; tax and accounting procedure; and steel mill operation. Organizer of the team is John Morrow Jr., veteran of 45 years with Harvester, the last 13 of them as vice president of purchasing and traffic. The group maintains offices in his name at 224 S. Michigan Ave., Chicago.

Four members were connected with Wisconsin Steel Works. These, with their last positions and years of service are: W. E. Brewster, general superintendent, 48; J. H. Dillon, chief engineer, 21; E. L. Ramsey, open-hearth superintendent, 26; L. B. Robertson, general superintendent, 27.

Other members, their last position and years of service are: Clarence D. Bending, chief mechanical engineer, West Pullman Works, 30; Albert J. Kramer, inspector general of manufacturing for Europe, 46; M. J. LaCroix, assistant to vice president, manufacturing, 38; T. J. Maloney, general traffic manager, 47; T. F. O'Brien, assistant purchasing department manager, 43; Albert W. Scarratt, vice president of engineering and patents, 20; John E. Shanahan, assistant comptroller, 46; William E. Worth, executive vice president, 28; and H. W. Maxon, assistant manager of construction engineering, 25. Mr. Maxon, who resigned in 1945 to form his own consulting company, is the only non-pensioner in the group.

When studies are requested, only those men versed in the particular phases pertaining to the client's problems are assigned to the job. These draw pay for the particular services they render and any income in excess of expenses including this pay is divided equally among all members of the group.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Defense Department is setting its sights on a streamlined security procedure. Top brass think industrial security standard at outbreak of a war will decide who will win it

OUR DEFENSE Department doesn't want to be caught napping if there's a shooting war. Pressed by the fear of "too little too late," top defense officials are stepping up the current on military preparations.

One matter receiving a lot of attention is the guarding of design and production "trade secrets."

With the idea that a high industrial security standard at the outbreak of a war may well decide the winning of the war, the department is setting its sights on a streamlined security procedure. This is the idea: To adopt uniform, fast-moving techniques to rid manufacturers of the confusion and delay that so often irritate them. New methods are being adopted as fast as they are approved. The whole new program should be in effect soon —probably by June 30, 1950.

Details of the new industrial security system, as broken down by Col. E. M. Tally Jr., chief, Office of Manpower, Munitions Board, call for these features:

A Central Security File. Instead of filling out security clearance forms many times as now required in doing business with Army, Navy and Air Force, you will have to fill out only one form to get security clearance. The new central file—with data on all individuals, organizations, facilities, plants, that have been cleared by any military unit as to be safely entrusted with production secrets—will show at a glance whether security clearance has or has not been granted. This file should be in operation at the Pentagon within two or three months.

Industrial Employment Review Board. Right now the only agency that can deny security clearance is the Joint Army-Navy-Air Force Personnel Security Board. Manufacturers object to it. They say it involves "star chamber proceedings." The new review board will receive and act on appeals from rulings of the joint board, and the review board is about ready to function.

Uniform Contract Classification Standards. If a carburetor used by the Navy, is classified, say, Secret or Top Secret, it will have the same classification with the other armed services. The writing of such standards is a tough job, and its accomplishment is likely to require several months.

Security Requirements Check List. This will be used to break down all contracts so that only classified components that are considered secret will be classified. If, for example, only the ignition system in a gas engine is classified, only persons working with the ignition system would have to be cleared for security.

Joint Security Agreement. If a contractor has contracts with all three military departments he must now follow three different sets of rules to protect production secrets. A new "Joint Security Agreement," written and awaiting final approval, is to be the only form the contractor has to sign to do business with any of the three departments.

Visitors' Clearance Procedure. Often a manufacturer must wait several days or more to get clearance to visit a plant to obtain necessary information. Under a new procedure, tentatively accepted and awaiting final approval, the system of controlling visitors to classified areas will be uniform and expeditious.

Industrial Security Clearance Manual. All the new procedures outlined so far will be described between two covers: A manual will be ready for distribution early next year.

Principles of Plant Protection. A book on the subject is in the final editing stage and will be ready for distribution next spring. It has been prepared with this idea in mind: The first hours of a new war, or even the days immediately preceding any declaration of war, will witness bombing or sabotage attacks on our key industries. The manual will tell contractors what to do under such circumstances. It is to be the keystone of other manuals to be issued later on—describing the hazards of specific industries. They will cover use of camouflage, underground construction, espionage and sabotage, and biological, chemical, aerial and radiological warfare.

Navy Yards and Docks Chief

CAPT. Joseph F. Jelley Jr., Civil Engineer Corps, USN., was appointed to a four-year term as chief of the Navy's Bureau of Yards and Docks and chief of civil engineers by President Truman.

The appointment, which will raise Captain Jelley to rear admiral rank, must be confirmed by Congress. He succeeds R. Adm. John J. Manning. Captain Jelley served as deputy chief of bureau since February, 1946. He selected Capt. Archibald D. Hunter to fill the deputy post.

Rear Admiral Manning will retire from active duty to accept a position in private industry.

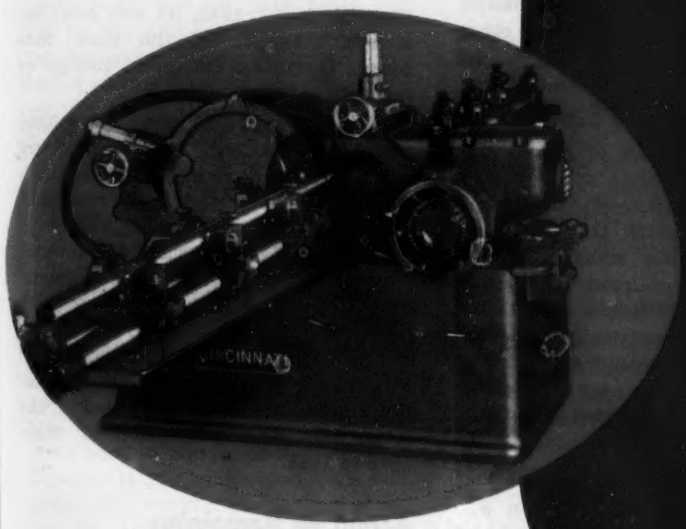
CAPT. JOSEPH F. JELLEY JR.
. . . chief of Navy's yards and docks

New Cargo Barges Designed

TWELVE large steel cargo barges that Dravo Corp., Neville Island, Pittsburgh, is to build for the Air Force are a new kind designed by the Army Transportation Corps for river use.

They will be employed by the Air Force for transporting aviation gasoline and kerosene in the Mississippi river and its tributaries. The barges are of the nonpropelled type, 40 x 235 ft. Each holds 13,000 barrels at loaded draft and is equipped with a diesel-operated vertical cargo pump. Among new design characteristics are rake ends for greater maneuverability and ample freeboard when loaded for

Right: Grinding an 18-foot bar on a CINCINNATI FILMATIC No. 3 Centerless Grinder equipped with a type D Long Bar Grinding Fixture. This unit has a capacity of 1" to 4" diameter, lengths up to 18 feet. Auxiliary attachment extends the range from ⅛" to 1" diameter, 8 feet long.



Above: CINCINNATI FILMATIC No. 3 Centerless Grinder equipped with type D Long Bar Grinding Fixture. Complete specifications are contained in catalog G-570-1. A copy is yours for the asking.

Adding Another Selling Point

TO STEEL BARS AND TUBES

Everything needs more selling these days. Some steel tube and bar mills are increasing the salability of these products by centerless grinding to customers' requirements of size and finish, or to obtain closer accuracy of their warehouse stock. ¶ CINCINNATI FILMATIC No. 3's are the first choice for this important job. They can be equipped to grind bars and tubes of any size up to 4" diameter by 18 feet long. They are ruggedly constructed to handle this heavy work and to remove metal at a rapid rate, expending up to 25 hp at the grinding wheel. An individual motor drives the regulating wheel through a simple gear train, offering more positive rotation to the heavy bars. FILMATIC bearings for the grinding wheel spindle require no adjustment or maintenance. These features and others are responsible for CINCINNATI FILMATIC No. 3 Centerless Grinder's fine record of dependable precision performance in the steel mills. They can make just as good a record in any shop where large heavy parts are precision ground. Ask for literature, or for a visit by one of our fieldmen.

CINCINNATI

CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES • CENTERLESS LAPPING MACHINES • CENTERLESS GRINDING MACHINES

use in harbors as well as inland waterways. They have light draft of 2 feet and loaded draft of 8 ft 2 in. Cargo is carried in 8 compartments.

Hunt Noninflammable Fluids

SEARCHING for noninflammable hydraulic fluids and lubricants, the Air Force's Air Materiel Command is concentrating on halogens containing phosphate esters.

Tests to date reveal that such material has low vapor pressure and improved viscosity-temperature characteristics. Further synthesis of this class of polyhalo materials is continuing so flash and free points and hydralytic stability can be improved. Numerous other polyhalo materials were rejected because of high vapor pressure, low flash and fire points, and high freezing points.

A National Aviation Policy?

POSSIBILITIES of establishing and implementing in continuity a long-range national aviation policy will be explored in Washington, Dec. 16 and 17. It will be sponsored by the National Aeronautic Association, Washington.

Army Improving War Tanks

IMPROVED TANKS are among the weapons now under development by the Army, says Gen. J. Lawton Collins, chief of staff.

He told his press conference that the Army is buying, out of current funds, new models of 28-ton light tanks, building a prototype of a medium 35-ton tank, and is studying plans for a heavy tank of more than 50 tons. The Army, he says, is purchasing "many" new high-reaching antiaircraft guns of the type known as "Skysweep."

Synthetic Fuel Encouraged

A BILL to encourage a synthetic liquid fuel industry stands a good chance of enactment at the next session of Congress.

The outlook is good as a result of observations by members of the House Interstate and Foreign Commerce Committee during their recent trip to Europe. They were particularly taken up with the shale oil plant at Kvarntorp, Sweden, where four processes are in use.

The committee has before it the Wolverton bill (H. R. 566) which would authorize 30-year loans at low interest to private companies for construction of synthetic liquid fuel plants operating either on shale oil or on coal. A similar measure in the Senate is the McCarran bill (S. 6). Sponsors hope to encourage opening of three or four plants with about a 50,000 bbl capacity of liquid fuel daily each. Such a program would give a fillip to steel and equipment industries: Each 50,000-bbl plant would require 122,000 net tons of plates and shapes, 65,000 tons of piping, and 90,000 tons of pumps, exchangers, compressors and other equipment.

Vanadium Reserves Studied

AMONG new Bureau of Mines projects is a study aimed at increasing usable reserves of domestic vanadium. It is concerned with the phosphate rocks of Wyoming which occur in thin beds. The bureau is seeking to work out a technique for mining this material economically. It also is working on a process for extracting the vanadium as a by-product of phosphoric acid production.

Uranium for Private Research

ATOMIC ENERGY Commission authorized production of 200 pounds of uranium metal for use under AEC license in non-Commission research projects in the U. S.

The metal will be specifically produced and fabricated in rod form by Mallinckrodt Chemical Works, St. Louis. It will be available only through commercial chemical channels; the price: $50 per pound. "We are making this material available," says Wilbur E. Kelley, manager of AEC's New York Operations, "to assist and foster private research and development in the traditional manner by private institutions."

AEC Makes Appointment

APPOINTED to the newly established position of deputy manager of the U. S. Atomic Energy Commission's Raw Materials Operations Office, Washington, is Jesse C. Johnson. Since January, 1948, he has been assistant manager of the Raw Materials Operation Office, in charge of domestic production.

Mr. Johnson will assist Manager John K. Gustafson in administering the entire AEC program for acquisition and production of all raw materials, including uranium, used in the national atomic energy program.

A native of Seattle, Mr. Johnson has been active in mining engineering work since 1917. He went to the AEC from the Reconstruction Finance Corp.'s Office of Metals Reserve where he served six years, the latter two as deputy director from 1946 to 1948.

Accent on Bargaining

STAFF of the Joint Congressional Committee on Labor-Management Relations is preparing a report for submission to the committee when Congress reconvenes in January.

It will suggest the kind of investigation to be made by the committee next year in determining if the public interest requires more labor-management legislation. Primary attention is being given to industry and union-wide bargaining.

Office of Small Business Begins New Service

NEW SERVICE for small firms that want Marshall Plan orders has been established by the Office of Small Business, Economic Cooperation Administration.

From time to time it will issue "Small Business Circulars" that will tell of business opportunities. The first such circular lists a large variety of industrial equipment and supplies which France hopes to acquire under Marshall Plan authorizations. The second lists 85 items of equipment and hand tools for an automotive repair and maintenance plant in Turkey. The third will contain a huge list of machinery and equipment for Austria. Soon to be issued is a list of Greek needs.

As a rule, the circulars are to be used in connection with "Commodity Supplier Data" lists published by ECA. The circulars describe the type of equipment and supplies wanted; the commodity supplier data lists give names of importers in different countries to be solicted for that kind of business.

There are occasional exceptions: The automotive repair and maintenance equipment will be bought by the Equipment and Procurement Branch, Bureau of Public Roads, Room 2111 General Services Administration Bldg., 18th and F streets N. W., Washington 25.

To get on the list for copies of the small business circulars and commodity supplier data, write to Office of Small Business, Economic Cooperation Administration, Washington 25. Or look in on the field office of the Department of Commerce closest to you.

Some chambers of commerce also will have copies.

First U.S. Trade Fair

Will be held in Chicago, Aug. 7 to 19, 1950. Foreign producers will meet host of U. S. buyers

INDUSTRIALISTS and businessmen throughout the world will turn their eyes toward Chicago next year. The First United States International Trade Fair will be held there. It will be the first international exposition for industry and commerce ever staged in this country and offers foreign producers their first opportunity to meet a flock of American buyers.

The announced plans for international fairs in Detroit and Atlantic City have been withdrawn. Patterned after the Leipzig and Antwerp trade fairs, the Chicago fair has the backing of ECA Administrator Paul Hoffman, Commerce Secretary Charles Sawyer and other American and foreign government officials. They praise it as a concrete way for Marshall Plan nations to earn more dollars.

One million square feet in four of Chicago's largest exhibition halls will display the world's wares from Aug. 7 to 19, 1950. Over 75,000 buyers are expected for the two-week affair.

Chemical Society Elects Officers

DR. N. HOWELL FURMAN, professor of chemistry at Princeton University, will be president of the American Chemical Society in 1951. Dr. Ernest H. Volwiler, executive vice president of Abbott Laboratories, North Chicago, Ill., is 1950 president.

New members of the board of directors are: Dr. Raymond E. Kirk, chemistry department head and graduate school dean at the Polytechnic Institute of Brooklyn, and Farrington Daniels, professor at the University of Wisconsin.

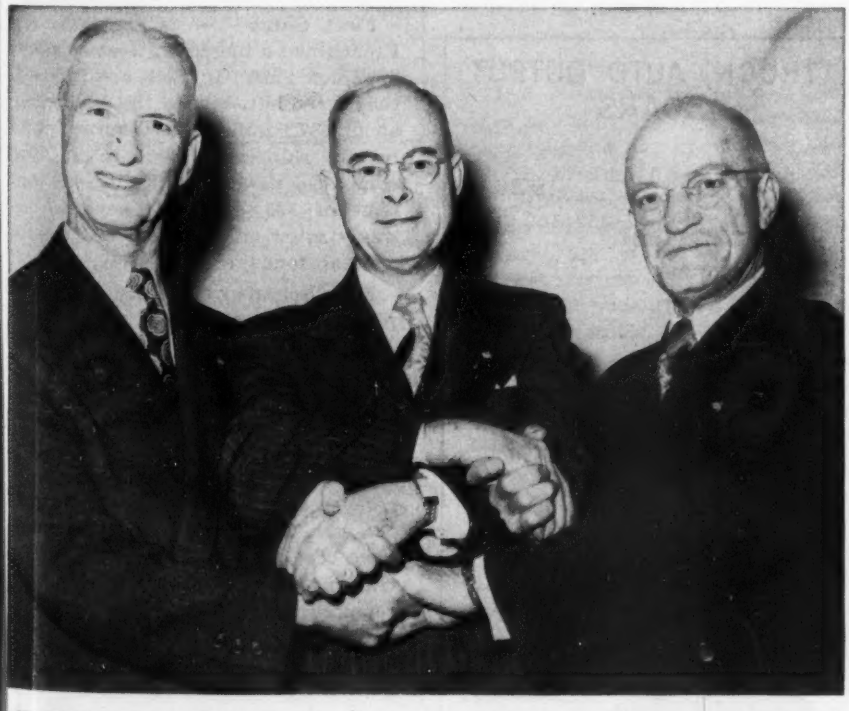
Weatherstrip Officials Named

WEATHERSTRIP Research Institute has elected these officers for 1950: President, John A. Goellner of Monarch Metal Weather Strip Corp.; vice president, Joseph P. Glaser of Chamberline Co. of America; treasurer, J. F. Dennis of W. J. Dennis & Co.; secretary, E. M. Rodenbaugh of National Metal Products Co.

Industrial Designers To Speak

SEVEN prominent representatives of the industrial design profession will be in Milwaukee Jan. 28 for a conference held in conjunction with the Milwaukee Art Institute's industrial design exhibition.

Guest speakers and their subjects will be: Walter Teague, "The historical development of the profession of industrial design;" Egmont Arens, "How the industrial designer is a link between the producer and the consumer;" Dave Chapman, "The description of the development of an industrial design project from start to finish." The exhibition will run from Jan. 10 to Feb. 19.



CENTURY OF SERVICE: Two brothers chalked up 50 years apiece with United States Steel Supply Co., U.S. Steel subsidiary. The company's Chicago district manager congratulates Andrew (left), 70, and Leonard Verschuur (right), 64, at the annual meeting of the company's 25-Year Club. NEA photo

CALENDAR OF MEETINGS

Dec. 12-15, National Warm Air Heating & Air Conditioning Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Society for Savings Bldg., Cleveland.

Dec. 15-16, American Management Association: Insurance conference, Drake Hotel, Chicago. Association headquarters are at 330 W. 42nd St., New York.

Dec. 21-22, National Electrical Manufacturers Association: Fourth annual national farm electrification conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 9-13, Society of Automotive Engineers: Annual meeting and engineering display, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-12, Society of the Plastics Industry: Reinforced plastics division meeting and fifth annual technical session, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

Jan. 12-13, Southern Supply & Machinery Distributors' Association: Industrial distribution forum and midyear meeting, Edgewater Gulf Hotel, Biloxi, Miss.

Jan. 16-18, Truck-Trailer Manufacturers Association: Meeting, Edgewater Gulf Hotel, Edgewater Park, Miss. Association headquarters are at 809 National Press Bldg., Washington.

Jan. 16-19, Plant Maintenance Show: Sponsored by American Society of Mechanical Engineers and Society for the Advancement of Management, at the Public Auditorium, Cleveland. Mechanical Engineers' headquarters are at 29 W. 39th St., New York.

Jan. 18-20, American Management Association: Conference on management problems, in San Francisco. Association headquarters are at 330 W. 42nd St., New York.

Jan. 18-20, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York.

Jan. 22-24, Institute of Scrap Iron & Steel Inc.: Annual convention, Hotel Statler, Washington. Institute headquarters are in the Dupont Circle Bldg., Washington.

Jan. 23-24, Industrial Furnace Manufacturers Association: Meeting, Dearborn Inn, Dearborn, Mich. Association headquarters are at 420 Lexington Ave., New York.

Jan. 23-27, American Society of Heating & Ventilating Engineers: Southwest air conditioning exposition, State Fair Park, Dallas. Society headquarters are at 480 Lexington Ave., New York.

Jan. 30-Feb. 1, American Material Handling Society, Chicago Chapter: Midwest material handling conference, in conjunction with Illinois Institute of Technology, in Chicago.

Feb. 12-16, American Institute of Mining & Metallurgical Engineers: General meeting, Hotel Statler, New York. Institute headquarters are at 29 W. 39th St., New York.

Feb. 13-14, Society of the Plastics Industry (Canada): Canadian annual meeting, Royal York Hotel, Toronto, Ont. The Canadian segment of the society is associated with the American society whose headquarters are at 295 Madison Ave., New York.

FRANCE .. Optimistic About Economic Prospects for 19

Communists may foment labor uprisings, but otherwise French expect reasonably stable year. Capital expansions are large; much new capacity will be in operation soon

WHEN many an American soldier had a furlough in Paris during the war, he became familiar with one approach used by women of the streets. A girl would dart up, grab his hat and run—but not too fast. Since a soldier without a cap is out of uniform and subject to arrest by military police, he *had* to give chase.

The French Communist labor groups are using the same technique to stir up non-Communist workers. The hats they're grabbing are issues championed by non-Communists: Higher wages, lower cost of living, paid vacations. It's no coincidence that the Red CGT, second largest union in the country, and the Workers Force, the largest and anti-Communist, staged a general warning strike last November on the same day despite their bitter rivalry. The Communists contributed to the collapse of the Queuille ministry last fall by stirring up a hue and cry for wage concessions that the government couldn't silence, so widespread was the commotion. Dissatisfaction exists; the Communists will use it to good effect even though their strength is probably less than it was a year ago. All this adds up to a sum which may give France a labor year in 1950. This could throw economic calculations into a cocked hat. Without the labor factor, results look promising.

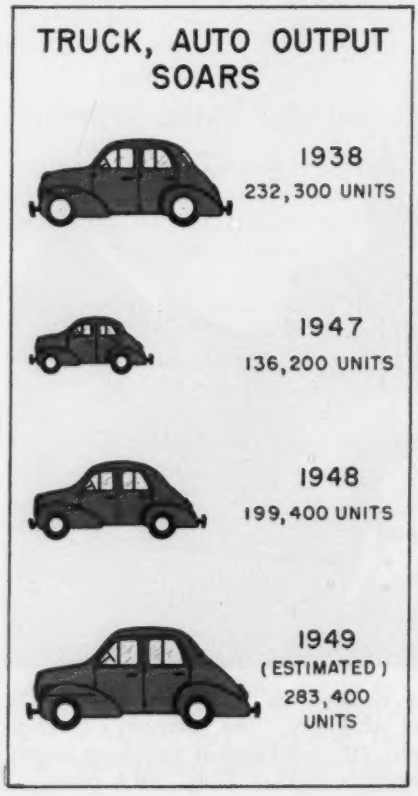
Production Improving — Agricultural production is about 96 per cent of the average for the 1934-1939 period, but industrial output is 105 per cent of the 1938 level. That is a long way from the Marshall plan goal of a 25 per cent boost in farm output and a 40 per cent gain in industry, but the schedule isn't too far off. France is in the middle of a $20 billion to $25 billion capital equipment program in industry and agriculture. Part of it will begin to pay off in 1950. About $3.5 billion of the program will be financed by ECA.

Most of the American money will modernize and expand the French steel industry so it can produce 13,750,000 net tons of ingot steel in 1952. Major projects include rebuilding of blast furnaces, erection of new ones and construction of open-hearth and bessemer plants and four electric steel works. Biggest jobs are in Moselle and Meurthe-et-Moselle. The French will be among the leaders of Europe in sheet production when continuous strip mills are completed at Denain and Montataire.

Steel Decontrolled — Producers of plates and sheets, the only steel items still allocated in 1949, slipped from the noose of government control last October. If you're a user of French plates and sheet, you still have to wait seven or eight months for delivery. For other products, three months at most.

Steel exports came up fast in the last half of 1949. September shipments hit 192,500 tons, compared with a monthly average of 121,000 in the first half. The monthly average in 1938 was 141,900. Rolled products dominate the export list. Plates and sheets are being shipped at a rate five times that of 1929. Pig iron and semifinished steel were the main steel exports before the war.

Small Autos for France—French automakers read the handwriting on the wall sometime ago and are now well entrenched as the leading small car builders in the world. The 2 hp Citroen which sells at about $630, the 4 hp Renault at $860, the Dyna Panhard and the Rosengart are the principal midget models. This type makes up more than half of all the automotive industry's production. This chart show that truck and car output in 1949 was 22 per cent above that of 1938.



Any Frenchman can now buy a car—if he has the cash and the patience to wait about eight months for delivery. Domestic sales lag, but car exports are four and a half times what they were before the war; truck exports are nine times the 1938 level. Domestic sales of French medium-price and size cars—notably Citroen, Peugeot and Ford Vedette—are practically nil, but exports are good.

Machine Tool Sales High—Machine tool builders are going like a house afire, largely because of the huge capital equipment program. Exports are picking up too. In the first six months of 1949, they were 32 per cent greater in money value than for all of 1948. This table shows the value of production for selected years, calculated in rates of exchange prevailing at the time.

1933	$10,000,000	1945	$44,354,800
1938	22,000,000	1948	81,074,900

Machine tool builders boast of improved productivity. Well they might. The annual output per man in 1948 was 88 per cent higher than in 1933, 38 per cent higher than in 1938.

Fleet Gains—Before the war, the French had a merchant fleet of about 3 million tons. In 1945 only 850,000 tons were left. Since the liberation, about $37.1 million has been spent to rebuild shipping. Builders in 1949 completed 48 vessels with a total tonnage of 136,870. New construction was started on 105 other ships with a total tonnage of 408,746.

French harbors have largely been rebuilt and equipped with much American machinery of greater capacity than before the war. Damage must still be repaired at Dunkerque, Boulogne, Marseille, Saint Nazaire and Le Havre.

Railroads Rebuild—Railroads have recovered nicely. Since the end of the war, 2491 bridges and 67 tunnels have been rebuilt. Practically all the tracks all over the country have been repaired. Trains are now traveling normally and according to schedule.

A new design for an electric locomotive has been developed and built by Société Nationale des Chemins de Fer. It weighs 111 tons and has horsepower of 4600.

Power Program Ahead—Expansion

Businessmen Fear Cream May Be Skimmed for . . . BELUX

Belgium-Luxemburg is embarrassed by riches. Since more and more other nations can't afford to deal with her she faces a recession in 1950

of power capacity, but not production, is ahead of schedule. The capacity target of 40 million kwhr by 1952 may be exceeded by 3 million kwhr. The French are doing their part, but nature isn't. Droughts cut electricity production seriously all last year.

The two biggest hydropower projects are at Ottmarsheim on the Rhine and at Donzere-Mondragon on the Rhone. Ottmarsheim plant and equipment will cost $8,570,000; half of this has or will be purchased in the U. S. The $200 million Donzere-Mondragon plant is designed to produce 1.7 billion kwhr of electricity per year, as well as to improve Rhone navigation and to irrigate the surrounding arid country.

Influenced by the drought, the French have decided not to put all their eggs in one basket. They are building steam generating plants, notably at Bordeaux and at Saint Nazaire. These units will use oil, not coal.

ON these pages are two more articles in a series on the economic pasts, presents and futures of the major Western European countries. On Dec. 5, pp. 74-75, we wrote about Italy and Sweden. Next week, Dec. 19, we discuss Great Britain and Western Germany. A summary of the situation in Britain and on the continent will appear Dec. 26. Complete iron and steel statistics for all industrial nations of the world will be carried in our 1950 Metalworking Yearbook issue, Jan. 2.

Coal in Poor Shape—The coal industry is still in poor shape. The pits were badly mined and sabotaged in the war; since the war repair and maintenance have been hampered by several savage strikes. But the industry hopes to be digging 66 million tons a year by 1960. Principal development work is at Bethune and Lens in northern France and in Lorraine.

French businessmen were panicky about economic prospects in 1947, alarmed in 1948, slightly optimistic in 1949. Now they feel confident that, barring severe strikes, they won't have to come to the U. S. with hat in hand when Marshall Plan aid ends.

LOOK at a map of Europe; you'll see that Belgium-Luxemburg is at the front doors of France, Germany and Britain.

Over the years Belux has built an industrial front porch, enclosed it, developed it to become almost an integral part of the French, British and German economic houses.

Embarrassed by Riches — That front porch has become almost too grand, and the neighbors are using the back ways. The Belux currency is so stable, her trade balance so favorable that more and more other countries can't afford to deal with her. One of the most heavily industrialized areas in the world faces a recession in 1950.

Belux took big dividends on her good economic position in the immediate postwar years, but the payments are petering out now. Industrial employment is 20 per cent lower than it was in 1948. In the first quarter, a record year for 1949 seemed possible. In March Belux produced 737,000 net tons of steel ingots and castings, an alltime high. One year ago 73 furnaces were in blast; 51 operated in November. Steel output for 1949 was less than for the previous year. In 1950 the decline will continue.

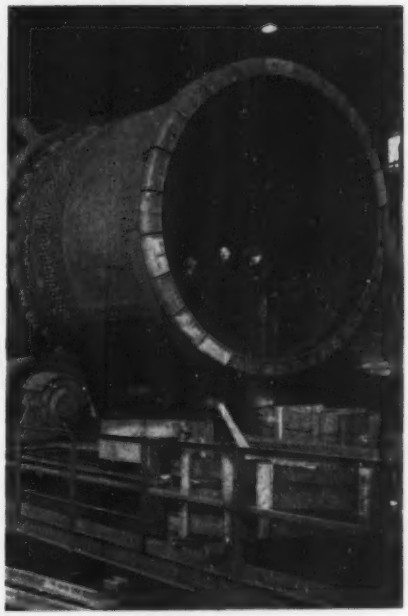
Iron Foundries Hit—Iron foundrymen are badly off. Prices are falling, especially on export orders. Many producers are only one step ahead of bankruptcy only because scrap prices have also sagged. Steel foundrymen are in better shape. The market for steel castings reached balance in mid-1949, and the outlook is still favorable.

Makers of wire, wire products and fasteners are alarmed. The orders booked in June were about 50 per cent of the average volume in 1948.

Reconstruction of war damage has been finished, and contractors are in the doldrums.

Railroad Equipment Outlook Fair—Railroad equipment manufacturers are mildly optimistic. Exports are declining but still good. Domestic needs are high because Belgium is electrifying many of its lines.

Shipbuilders fear they may be scuttled by devaluation of the pound and rising German competition. Repair work now is just a driblet, but new construction holds.



BELUX EQUIPMENT BEST IN EUROPE
. . . like this blast furnace dust collector

Builders of machine tools and textile machinery are keeping up operations because they are constructing for stock.

Technologically Advanced—Technologically, Belux is in an enviable position. Her plant and equipment are relatively modern; the best in Europe. Large expansions and modernizations are in progress. New installations to be ready in 1950 should enable her to produce more at a lower cost. Blast furnaces are being modernized and additional capacity planned. Technical modifications will permit greater production from open hearths. New rolling mills, notably semicontinuous hot strip units, are being considered.

Belux is worried about market prospects. A partial answer may be in her own house. The domestic market is growing. Population in 1952 will be 12 per cent greater than before the war. Aside from the birth rate, Belux can still console herself with the thought that her house is still one of the best ordered in Europe. Her franc is nearly as good as the dollar. She has a favorable balance of trade with everybody in the world but the United States.

the trend is to N-A-X HIGH-TENSILE STEEL for

BUMPERS • GRILLES • HOODS
FENDERS • BODY PANELS • DECK LIDS
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GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
Unit of National Steel Corporation

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Automakers plan heavy production schedules for January and February. Steel flowing into plants in larger volume than was expected. Overtime operations likely

DETROIT

INTENSE pressure is being placed on production schedules for early 1950 and prospects point to overtime operations for January and February as the industry girds to turn out every car possible.

The rubber ball rebound in steel intake has surprised even the most optimistic, and as a result production schedules have not suffered nearly to the extent expected a few weeks ago.

Thousands of those who had anticipated layoffs of several weeks are coming back to their jobs and revisions of assembly schedules are the order of the day.

The big push on assemblies for the first quarter of next year has suppliers confused, albeit pleasantly. They are wondering why the terrific drive for production in a season which is normally rather slack from a sales standpoint, and about the only answer that seems to come up is that the motor plants are driving for every ounce of production while the going is good, possibly on the hunch that further inflation is in the offing later in 1950, which could put the squeeze on automobile sales.

Many Plants Resume—Most plants which had been shut down as a result of steel shortage or model changeover were in operation again last week and final assemblies should resume this week in good volume. The 20 millionth postwar vehicle will be assembled some time this month and this volume was achieved in one year's less time than was required prewar for the same total.

GM To Show New Models—All lines of General Motors' new models will be presented to the public formally at the Waldorf-Astoria in New York, Jan. 19-27 at a show which will be called the Mid-Century Motorama. All of the space available on the Waldorf ballroom floor, including the grand ballroom itself and adjacent salons, totaling more than 25,000 sq ft, will be utilized. Thirty-eight new models of the GM family will be on display, as well as elaborate chassis, engine and transmission exhibits. Selected models of each of the five GM automobile lines will be featured prominently, with a background indicating the advances in each since the first cars made early in the century.

Willys Develops New Engine

A NEW high-compression engine is in the advanced stages of development at Willys-Overland, and the talk is that it may be adopted in the new low-priced Kaiser model now being tooled, although there is no official confirmation from either company. The new engine, which will be available in both four and six cylinders, is being readied for the Willys spring product program, according to the company announcement. It is approximately the same size as current Willys engine, although it has an appreciable increase in horsepower and embodies some features described as "revolutionary" for American automotive engines. Delmar G. Roos, first vice president of the company, says tests now under way show a remarkable improvement in fuel economy, while horsepower and torque per cubic inch displacement compare favorably with the best published results in Europe and the United States. The company has been experimenting with compression ratios as high as 8 to 1 in the new engine.

Engine Plant Status Vague

STATUS of the Kaiser-Frazer engine plant in Detroit remains vague, all operations there having stopped. The plant was leased from Continental Motors some time ago when K-F was dissatisfied with the volume of production being realized. One report is to the effect future output of engines for K-F will be transferred to Muskegon, Mich., where Continental has a large plant. Still another version of K-F's plans was described by a radio newscaster as involving the supply of engines and chassis by the Fiat Co. in Italy, with bodies to be built in this country.

Battle between Kaiser-Frazer and Otis & Co. grows furiouser and furiouser. Latest blow was struck by Cyrus Eaton of Otis in a telegram to the Securities and Exchange Commission, protesting against Kaiser's failure to issue a third-quarter financial statement. Quoting Mr. Eaton, "At the annual meeting in May, Kaiser promised stockholders profitable operations for 1949. It is now clear that K-F's operating losses will be at least $20 million, with the rest of the automobile industry register-

FOR ABOUT-TOWN TRANSPORTATION: This Airway car was developed by T. P. Hall Engineering Corp., San Diego, Calif., to sell in the $500 to $686 price range. It is powered with a 10-hp air-cooled aluminum engine, travels 45 miles on a gallon. Hall plans to license other manufacturers to build the 775-pound aluminum alloy-plastic car

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ing the biggest sales and profits in history . . . with $20 million eaten up in losses and $16 million used to pay off bank loans, K-F's RFC loans are already practically dissipated. Defenseless stockholders have been consistently deceived and despoiled by Kaiser management. Where is the SEC which so vaunts itself on its protection of the investing public and on its requirements of full disclosure."

Nash Plants Reopen

MAIN plants of Nash in Milwaukee and Kenosha will reopen this week, following a 23-day shutdown. Production will be resumed at about one-half the rate in force before the closing. The reduced schedule calls for manufacture of approximately 400 cars per day at the start and a step-up to and above the pre-shutdown rates as rapidly as possible. About 13,000 were idled Nov. 18 when a steel shortage forced Nash to close.

Nash Motors Division of Nash-Kelvinator in El Segundo, Calif., notified workers that because of the steel strike and "the resultant inability of our suppliers to obtain necessary steel," the plant would stop production beginning last Friday. Plans are to resume again Jan. 3.

Cut Hydra-Matic Prices

CONTRARY to reports published here earlier, both Nash and Lincoln reduced prices on their Hydra-Matic drive transmissions, purchased from General Motors. Reductions conform to those made by Pontiac, Oldsmobile and Cadillac, amounting to approximately $25. A General Motors sales official had told this writer that the price cut would not be extended to either Nash or Lincoln in view of their firm contracts for the transmissions at a stipulated price. However, he apparently was in error in view of the recently announced price changes.

Dynaflow Is Lower

MEANWHILE Buick has cut the price of its Dynaflow transmission by $40, equivalent to 20 per cent. The reduction lowers the list price of the transmission from $200 to $160 and was effective Dec. 1. In announcing the price change, Buick reports that during this year better than 262,000 of the transmissions have been built and 71 per cent of all car production has been equipped with the device. Introduced less than two years ago, a total of more than 335,000 of the automatic transmissions has been manufactured.

Price reductions on transmissions point up the coming keen race in this field which will be livelier when Chevrolet brings out its automatic transmission on the 1950 models. The price tag on this unit has not been announced although one report has put it at about $100. Ford has disclosed its new automatic transmission, to be available next summer, will not exceed $150 in cost. The exact figure probably will depend to a large extent on what Chevrolet does.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	601,021	516,814
November	444,600*	495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Nov. 19	115,152	120,718
Nov. 26	76,026	89,482
Dec. 3	71,921	125,170
Dec. 10	70,000	124,041

Estimates by Ward's Automotive Reports

Chrysler Readies New Models

CHRYSLER Corp. will show its new 1950 models to the press on Dec. 15. Extensive changes have been made in roofs, rear quarter panels, rear fenders and rear decks and initial production was under way last week. Apparently the company anticipates a considerable increase in demand for its semiautomatic type of transmission, offered on Chrysler, Dodge and DeSoto models, in view of the large equipment installations made recently at the Dodge main plant where these units are manufactured. Output of standard transmissions has been transferred to Kokomo, Ind., to make room for higher volume of the automatic units at Dodge.

Chrysler notified 14,000 of its 55,000 idle employees affected by steel and parts shortages to return to work last week. Additional workers will be recalled this week; full production will be resumed soon.

Dodge, DeSoto and Chrysler assembly lines have been down since Nov. 4. The Plymouth and Dodge truck assemblies were closed Nov. 23.

Operations at Briggs Mfg. Co.'s Conner plant resumed on full schedules last week. Nearly all Briggs employees in other plants are back on the job.

Auto Buyers Heavily in Debt

U. S. CONSUMERS continue to go heavily into debt to buy goods—particularly automobiles—on the installment plan. Installment credit outstanding Oct. 31 totaled $10,171 million, says the Federal Reserve Board. This is a $278 million rise during the month and a gain of $1938 million over a year ago.

Auto purchases account for $126 million of the climb in installment credit in October. At the end of that month Americans owed $3002 million on their cars. This was $1113 million more than on Oct. 31, 1948.

Automobile Every Second

THE AUTOMOBILE Manufacturers Association figures 52 new motor vehicles a minute, or nearly one a second, came off assembly lines of the industry each working day during the first ten months of this year. In this time all previous annual production marks were eclipsed.

No Change in Wages

QUARTERLY check on the Bureau of Labor Statistics consumer price index, as of Oct. 15, showed it to be unchanged from the level of July 15, so there will be no change in wage rates for 355,000 General Motors employees during the next three months. Late in February, a review will be made again based on the index for Jan. 15. Two declines in the index during 1949 were offset by a 3-cent annual improvement factor applied at the end of May, so wage rates actually have held steady for better than a year.

Allison Develops Aircraft Engine

ALLISON Division of General Motors Corp. announces a new propeller-turbine aircraft engine. Allison claims it produces more power for its size than any similar engine yet disclosed anywhere in the world.

The engine is called the XT40 Turbo-Prop and can produce more than 2 hp for each pound of engine weight. The engine is rated at 5500 hp.

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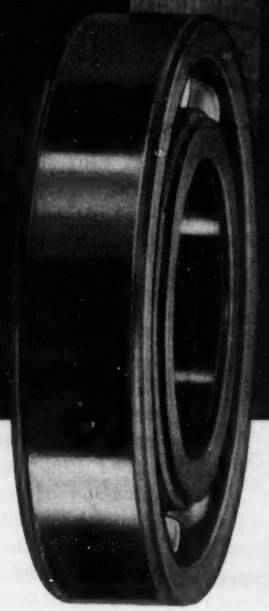
You couldn't buy
a better bearing!



NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

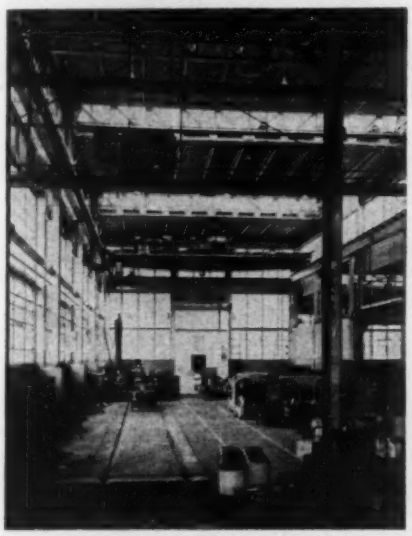
Builds Flexible Addition

Cooper-Bessemer solves problem of erratic production activity with unique structure

COOPER-BESSEMER Corp., Mt. Vernon, O., got off the horns of a dilemma when its officers decided to build a simple but unique new addition.

A builder of large gas and diesel engines for locomotives, marine and power generation, it was faced with this situation: Production activity varied radically from month to month. Company officers wondered how they could provide adequate production capacity without "overbuilding" existing factory facilities. They solved the problem by erecting a strategically located addition that permits exceptional flexibility of operations.

"Our approach to the problem," explains Peter Lutz, works manager of Cooper-Bessemer, "has been to design the new plant addition so it can be used not only for efficient assembly of machinery sub-units like compressors and power cylinders but be converted quickly and with little expense for the assembly of complete engines. It can be used for actual machining operations, for welding or even for foundry molding operations.



COOPER-BESSEMER PLANT ADDITION
. . . no production-limiting bottlenecks

Now unexpected overloads in adjacent departments can be absorbed easily in the new addition, and cost-consuming, production-limiting bottlenecks are eliminated.

The structure, which cost $210,000, consists basically of two bays. It makes 11,000 sq ft of useful floor space available. One bay has a 30-ton crane with a track span equal to those in other parts of the plant. It adds flexibility to plant operations because it can be moved to other parts of the plant at any time production activity demands it.

After Century B M & R Moves

AFTER more than a century in one place, Beals, McCarthy & Rogers Inc., steel distributor, will build a new $750,000 office and warehouse in Buffalo.

The company will move its headquarters from the old downtown landmark at 50 Terrace where room is being made for a railroad track relocation. The new two-story building is to have 115,000 sq ft of floor space; Siegfried Construction Co. Inc., Buffalo, will have the structure ready for occupancy in about nine months.

New Western Electric Subsidiary

NEW SUBSIDIARY of Western Electric Co. Inc. — Audivox Inc. — was formed to take over activities of Western Electric Hearing Aid Division.

Audivox, says F. R. Lack, vice president of Western Electric, will assume all warranties now in force on company-made hearing aids and audiometers. E. S. Gregg, vice president of Westrex Corp., another subsidiary of Western Electric, will be president of Audivox. William E. Snodgrass, vice president and general manager, will be operating head of the new organization.

See 'Em, Hear 'Em Before Buying

A SETUP which gives prospective buyers of used machinery an opportunity to see and hear machines before they buy them has been worked out by Marquette Machinery Co. in its new building in Dearborn, Mich.

The 13,000-sq ft building with 8000 sq ft of storage space in an adjoining structure is equipped with 100 hp electrical service. It permits operation of any machine on the floor on short notice.

Marquette was formed in 1945 by Walter A. Hannaum and I. "Mike" Gruskin. The used-machinery company moved from its quarters in Dearborn where offices and a warehouse were maintained.

Truscon Expanding Office Space

CONCENTRATION of its executive and engineering personnel is what Truscon Steel Co. officials have in mind in building a large addition to their general office building in Youngstown.

Estimated cost of the structure is $250,000. It will be 45 x 145 ft with two floors and a basement. It will add 18,000 sq ft of floor space to the present building. Since it will relieve overcrowding of Truscon personnel, the company will be able to move 70 sash engineers from Republic Steel Corp.'s office building to its own quarters.

Construction of the new building—to be ready in January—apparently scotches rumors that Truscon, a Republic subsidiary, is moving to Cleveland to be near Republic's general offices. Republic's Youngstown district offices are being moved from its Poland avenue plant to the company's office building. District Manager John H. Graft says district order, schedule and engineering departments also will move.

The Youngstown district sales office, headed by C. G. Medley, moved from Youngstown to Warren, O.

Kaiser Leases Utah Coal Reserve

ADDITION of a new coking coal reserve of 600 acres to its central Utah coal holdings is announced by Kaiser Steel Corp. This brings the company's coal deposits under lease to 3640 acres, or a supply estimated at more than 36 million tons.

The latest lease was obtained by Kaiser Steel from U. S. Department of Interior, in competitive bidding. Company estimates that its total coking coal reserves will supply Fontana's two blast furnaces at capacity for more than 40 years.

Another "First" in Safety

A NEW FIRST in safety was established at South Works of Carnegie-Illinois Steel Corp., a U. S. Steel subsidiary: For the second time in the last year the plant's maintenance division, employing nearly 2500 men, worked 2 million man-hours without a lost-time accident.

Instrumentation Studied

INSTRUMENT technicians from most of the nation's leading steel mills completed an intensive course last month at the Brown School of Instrumentation in Philadelphia.

The two-week course was on application of controlling and measuring instruments to phases of steelmaking and processing. M. L. Ladden, head instructor, says the work was a continuation of special industry-group classes started several months ago by Brown Instrument Division of Minneapolis-Honeywell Regulator Co.

Briefs . . . .

Colonial Broach Co., Detroit — broaches, broaching machines, sharpening equipment, hydraulic presses and allied equipment — appointed Geoffrey Co., Denver, representative in Colorado, Utah and Wyoming. Geoffrey will also handle drill jig bushings, steel stamps, and marking devices produced by Colonial Bushings Inc., and New Method Steel Stamps Inc. of Detroit.

—o—

American Brake Shoe Co., New York, acquired the government-owned Buffalo plant occupied by Farrel-Birmingham Co. Inc. during the war. The plant will be used to manufacture railroad accessories — frogs, switches and crossings. Paul O. Wustrack, who was superintendent of American Brake Shoe's Niagara Falls, N. Y., plant, was named superintendent of the Buffalo plant.

—o—

Le Jax Products Corp., Brooklyn, N. Y., was organized to manufacture metal products including base cabinets, wardrobes and promotional metal utilities. Jack Bogatz is head of the new corporation.

—o—

Thermometer business of **American Thermometer Co.,** St. Louis, was purchased by **H-B Instrument Co.,** Philadelphia. H-B can now offer metal or wood frame thermometers for such varied purposes as tobacco curing, incubating, air duct and diesel engine temperatures.

—o—

Federal Power Commission approved the experimental use of aluminum alloy in a natural gas pipeline. It granted Alabama-Tennessee Natural Gas Co., Florence, Ala., permission to substitute aluminum alloy for steel in a 9500-foot section of 8-inch lateral line to serve Reynolds Alloy Co. at Listerhill, Ala. The commission explains that Reynolds asked for use of aluminum alloy pipe for experimental purposes and said that the change would add $6300 to construction cost.

—o—

Michigan Tool Co., Detroit — gear cutting and finishing machines, gear cutting tools, gear checking equipment—named F. H. Harris Co., Worcester, Mass., service and sales representative.

—o—

Warner & Swasey Co., Cleveland—turret lathes, textile machinery—was recognized by Freedoms Foundation as doing an outstanding job in fostering the American way of life. The company's advertising campaign, prepared by Griswold-Eshleman Co., Cleveland, was cited as a great contribution to the principles of freedom by a panel of judges made up of state supreme court judges and officials of American patriotic societies.

—o—

Hyster Co., Portland, Oreg. — fork lift trucks, mobile cranes, straddle trucks and their attachments—appointed three new distributors: A. & W. Engineering Co., Miami, Fla., will cover 17 counties in the southern part of Florida; Wrenn Brothers, Charlotte, N. C., will cover a territory comprising all of South Carolina, the southern part of North Carolina and most of Georgia; King and Kringel Machinery Corp., Denver, will cover all of Colorado, most of Wyoming and the western part of Nebraska. Hyster has factories in Portland, Peoria and Danville, Ill.

—o—

Rockwell Mfg. Co., Pittsburgh, acquired an automatic air hydraulic drill head that will be manufactured at its Delta Mfg. Division plant in Milwaukee. The drill head was formerly made by Cleveland Republic Tool Corp.

—o—

Canadian Pacific Railway has received two first-class coaches from Angus Shops, Montreal, Que. The two cars are the first of an order for 64. Canadian Pacific also received: Five refrigerator cars from National Steel Car Corp., the first of an order for 350; 292 gondola cars from Eastern Car Corp., the first of an order for 650; 181 flat cars from National Steel Car Corp., completing an order for 200; 17 cabooses from Angus Shops; and six 5-bedroom, 10-roomette sleeping car frames from National Steel Car Corp.

—o—

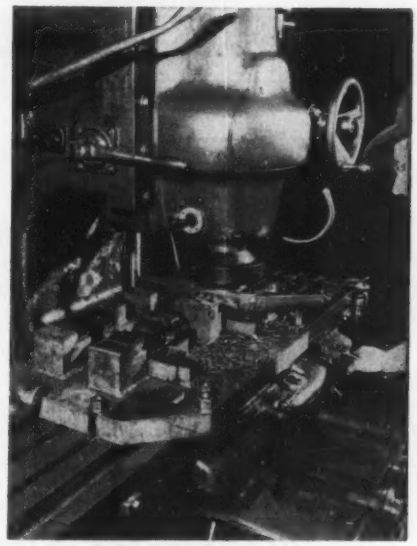
South Buffalo Railway Co. will spend about $300,000 to modernize its roundhouse in Lackawanna, N. Y. The railway is a terminal switching line serving a dozen industries near the Bethlehem Steel Co.'s Lackawanna plant.

—o—

Magnus Chemical Co., Garwood, N. J., made its Magnus Metalcoat products and complete line of wire drawing lubricants available in Canada through Magnus Chemicals Ltd., Montreal, Que. Magnus Chemicals Ltd. is an entirely Canadian organization; Paul Pichet is president. Harold L. Trembicki, manager of the Metal Coating Division of Magnus Chemical Co., will be technical adviser for the Canadian company on all wire drawing activities.

—o—

S. P. Kinny Engineers Inc. will move its offices from Pittsburgh to Carnegie, Pa., location of its plant. Shops are arranged to do machine and plate work. They are equipped with horizontal boring mills, milling machines and other machinery necessary to build blast furnace equipment. They can also do various types of welding and pipe bending and fitting. Kinney plans to manufacture blast furnace stove bottoms, stove burners, primary and secondary gas washers, all types of blast furnace valves, self-cleaning and basket water strainers.



WATCHMAKER PRECISION: Fixture for milling wing stiffener fittings for Boeing's B-47 Stratojet is proofed on vertical mill at Texas Engineering & Mfg. Co. Inc., Dallas. Fixture checked out at a tolerance 10 times better than the 0.005-in. tolerance specified

—o—

Amperex Electronic Corp., Brooklyn, N. Y.—radio vacuum tubes—named Allen I. Williams Co., Denver, sales representative in Colorado, New Mexico, Wyoming, Nebraska, Utah and Kansas.

—o—

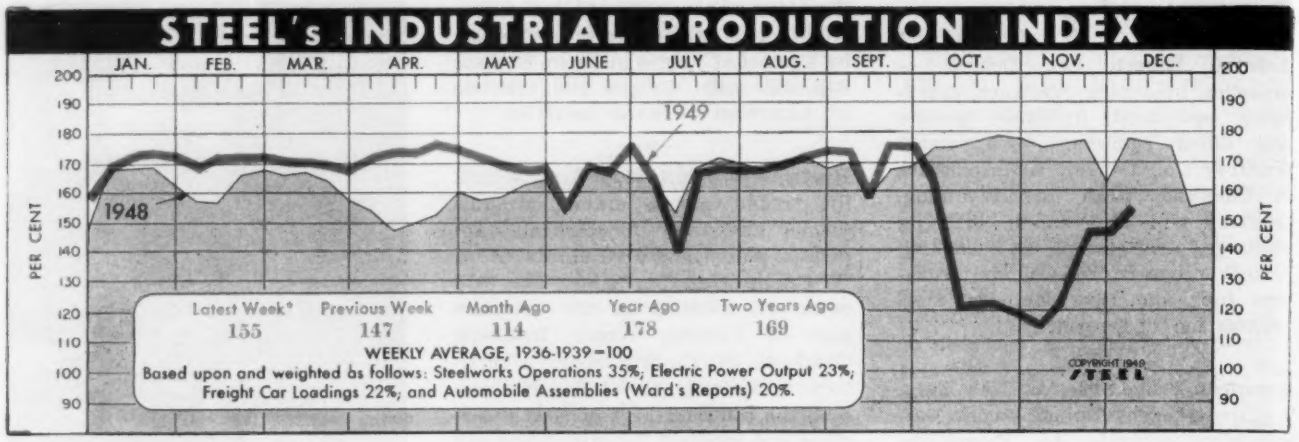
A new plant of **Englander Co.,** Chicago—sleeping equipment—is scheduled to be built soon in Cincinnati. It is one of 16 being added by the company.

—o—

Commercial Solvents Corp., New York, will build a $670,000 plant in Terre Haute, Ind., to increase antibiotic production.

—o—

Fred H. Rohr, president of **Rohr Aircraft Corp.,** Chula Vista, Calif., subsidiary of Newport Steel Corp., Newport, Ky., said he and a group of associates will buy the assets and business of the aircraft company from the parent firm for over $5 million.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1948
1949
Latest Week* 155
Previous Week 147
Month Ago 114
Year Ago 178
Two Years Ago 169
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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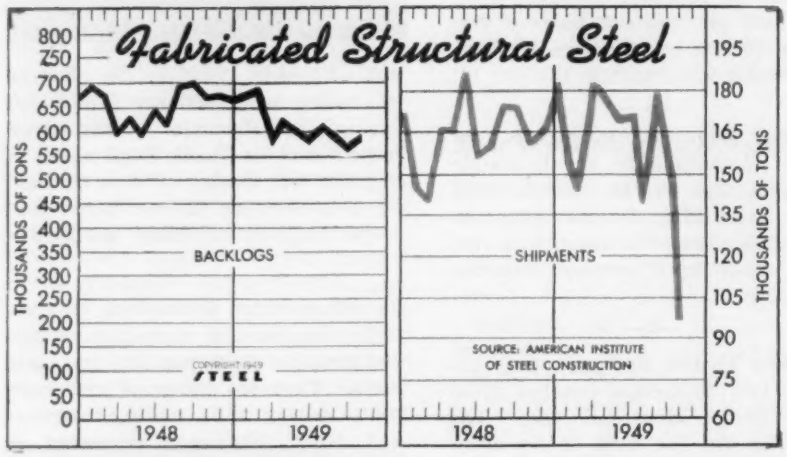
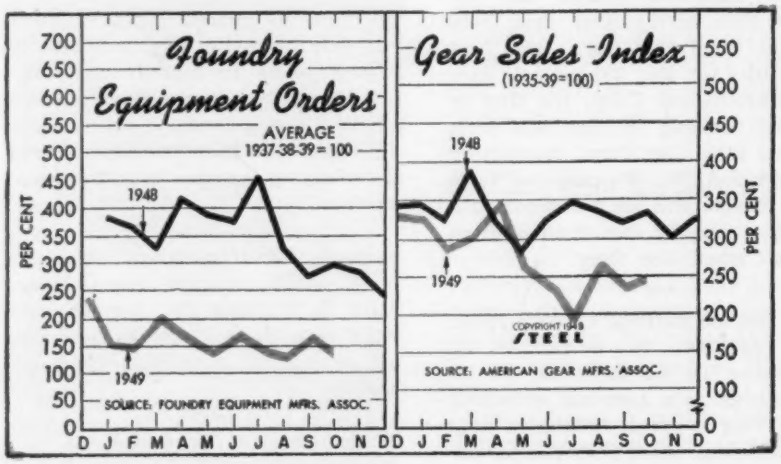
*Week ended Dec. 3 (preliminary).



Fabricated Structural Steel
(000 Tons)

	Shipments			Backlogs		
	1949	1948	1947	1949	1948	1947
Jan.	152.7	146.4	140.6	675	692	661
Feb.	145.9	141.6	136.1	683	673	656
Mar.	185.9	167.0	137.8	582	597	614
Apr.	179.2	166.7	157.4	628	630	632
May	171.1	186.9	155.0	599	593	628
June	172.3	157.1	151.9	583	647	634
July	148.0*	160.8	169.9	605	613	661
Aug.	183.9*	176.3	158.0	583	691	639
Sept.	162.1*	175.0	164.3	562	698	648
Oct.	95.4	164.0	196.1	584	669	649
Nov.	....	169.8	175.0	...	673	645
Dec.	....	182.4	173.0	...	670	671
Total	....	1,993.9	1,915.1			

* Revised.


Foundry Equipment Orders
AVERAGE 1937-38-39=100
PER CENT
1948
1949
SOURCE: FOUNDRY EQUIPMENT MFRS. ASSOC.
Gear Sales Index
(1935-39=100)
SOURCE: AMERICAN GEAR MFRS. ASSOC.
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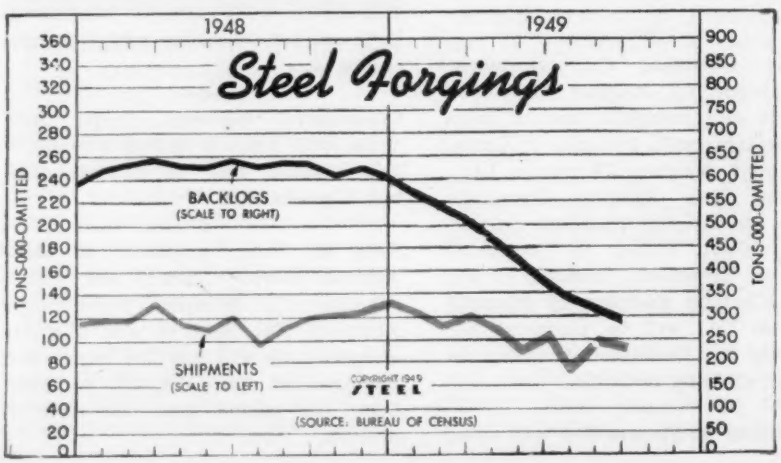
D J F M A M J J A S O N D D J F M A M J J A S O N D

Foundry Equipment Orders*

Gear Sales

	Index (1937-1939=100)		Index (1935-1939=100)	
	1949	1948	1949	1948
Jan.	149.9	380.9	320.7	346.8
Feb.	144.4	367.3	282.3	324.4
Mar.	190.8	326.2	299.1	389.8
Apr.	172.0	412.0	339.0	320.9
May	121.9	388.5	250.1	283.6
June	164.9	376.8	227.8	324.1
July	146.6	456.3	193.1	348.4
Aug.	127.1	324.7	262.0	335.6
Sept.	166.6	273.5	224.9	320.4
Oct.	133.5	296.0	242.3	333.3
Nov.	....	284.4	....	309.0
Dec.	....	243.7	....	325.9

* By foundry trades only.



Steel Forgings
(Tons—000 omitted)

	Shipments*		Unfilled Orders*	
	1949	1948	1949	1948
January	125	118	571	618
February	111	117	540	631
March	120	131	504	641
April	104	114	465	628
May	92	109	412	624
June	101	119	377	639
July	70	97	348	625
August	96	111	312	634
September	88	121	294	631
October	...	123	...	605
November	...	124	...	621
December	...	132	...	601

* Forgings for sale.

The Business Trend

ANOTHER step upward in the recovery of STEEL's industrial production index to prestrike levels was taken in the week ended Dec. 3, despite small production in the automotive industry. The index rose 8 points from the level of the preceding week to 155 per cent (preliminary) of the 1936-1939 average.

STEEL—Again the pacesetter in the index's climb was the steadily improving steelmaking rate. It climbed to 89.5 per cent of capacity in the week ended Dec. 3, the highest point since the first week in June. Operations will climb even higher in the current week and are expected to remain up at least until the year-end holiday slowdown.

AUTOMOBILES—Outturn of the automotive industry fell below the level for the preceding holiday-affected week in the week ended Dec. 3. Only 61,658 passenger cars and 10,263 trucks rolled off U. S. and Canadian assembly lines during the week. The total of 71,921 units was about 4000 lower than in the preceding week. Changeovers and a pinch for certain steel items are the reasons for the low production of the last two weeks. On the bright side of the ledger is the fact that recovery to high level production will come sooner than originally estimated. Many laid-off workers already have been recalled and almost all should be back at their jobs by the end of this month. Late this month the 20 millionth U. S. postwar vehicle will be assembled. Passenger cars account for 73 per cent of postwar production with trucks making up the remaining 27 per cent. A shift in demand is evident in 1949 with passenger car output accounting for 82 per cent of the year's total.

COAL—Bituminous coal stocks dropped almost 15 million tons during October to 47,329,000 tons on Nov. 1. Stockpiles have declined about 27 million tons from the level reached on July 1 because of numerous work stoppages and reduced work-weeks. Industrial stocks also fell in the latest month to 53 days' supply from 66 days a month earlier. Days' supply held by various industries on Nov. 1 were: Electric power utilities, 97; coke ovens, 42; steel and rolling mills, 51; cement mills, 50; railroads, 28; other industrials, 42.

BUSINESS—Dun & Bradstreet's tabulations show 6877 stock corporations were chartered in October. This was only slightly higher than the September total of 6867 and 2.9 per cent higher than the 6686 businesses chartered in October, 1948.

POWER—Edison Electric Institute reports that September sales of electric energy to ultimate customers totaled 20,894,712,000 kwh, up 1.7 per cent over the same month in 1948. Revenue from these sales was $387,528,700, an increase of 5.8 per cent over receipts on September, 1948, sales.

CONSTRUCTION—Civil engineering construction volume rebounded to $219,647,000 in the week ended Dec. 1, from $90,244,000 in the preceding week. Heavy construction for the year to date totals $7,513,489,000, 14 per cent above the like 1948 total.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	89.5	80.0	12.0	100.0
	Electric Power Distributed (million kilowatt hours)	5,743	5,537	5,435	5,646
	Bituminous Coal Production (daily av.—1000 tons)	2,107	2,333	462	1,748
	Petroleum Production (daily av.—1000 bbl)	5,105	5,192	5,136	5,665
	Construction Volume (ENR—Unit $1,000,000)	$219.6	$90.2	$169.9	$362.3
	Automobile and Truck Output (Ward's—number units)	71,921	76,026	116,699	125,170
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	725†	665	579	804
	Business Failures (Dun & Bradstreet, number)	221	148	196	126
	Money in Circulation (in millions of dollars)‡	$27,542	$27,508	$27,382	$28,322
	Department Store Sales (changes from like wk. a yr. ago)‡	−5%	−8%	−7%	−5%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,269	$14,492	$14,010	$12,543
	Federal Gross Debt (billions)	$257.0	$256.9	$256.9	$252.6
	Bond Volume, NYSE (millions)	$23.0	$14.9	$18.7	$16.5
	Stocks Sales, NYSE (thousands of shares)	8,315	5,706	7,226	6,352
	Loans and Investments (billions)†	$66.7	$66.5	$66.8	$62.5
	United States Gov't. Obligations Held (millions)†	$37,430	$37,257	$37,838	$33,073
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	164.0	164.8	170.6	232.6
	All Commodities†	151.4	151.5	151.4	163.9
	Metals and Metal Products†	169.2	169.2	168.8	173.7
	†Bureau of Labor Statistics Index. 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

R. J. LECKRONE

R. J. Leckrone has been appointed chief engineer of **Mackintosh-Hemphill Co.**, Pittsburgh and Midland, Pa. He will direct the company's engineering of rolling mill equipment, and will also assist in machinery sales program. Mr. Leckrone has been active in the design and sales of rolling mill equipment during the last 20 years. He has been affiliated with Morgan Engineering Co., E. W. Bliss Co., Continental Foundry & Machine Co., and Lewis Foundry & Machine Division of Blaw-Knox Co., where he served for eight years as chief designing engineer. He spent three years in Russia as chief engineer in charge of American specialists in design and installation of rolling mill equipment for the U. S. S. R. in the Ukraine.

—o—

M. G. Wicker and **H. T. Wadley** have been elected vice presidents of **Magnolia Airco Gas Products Co.**, Houston. Both men were district managers for Air Reduction Sales Co., a Magnolia Airco affiliate, prior to their promotion. Their sales territories, which included portions of Oklahoma, Louisiana and Arkansas, will now be serviced by the Magnolia Airco organization. Mr. Wicker will continue to have headquarters in Oklahoma City, Okla., and Mr. Wadley will remain in Shreveport, La.

—o—

Weir Kilby Corp., Cincinnati, announces the following appointments: **Ralph F. Gordon,** vice president-sales; **M. J. Hassan,** vice president-engineering; **J. G. Kreis,** vice president-purchases; **E. H. Schubert,** vice president-operations; and **Ralph G. Detmer,** assistant to the president, sales and engineering. Mr. Detmer was formerly vice president of American Frog & Switch Co., Hamilton, O.

B. T. ROE

B. T. Roe has been appointed vice president in charge of sales for **Tracy Mfg. Co.**, Pittsburgh. Mr. Roe assumed his duties Nov. 15 after resigning as vice president and general manager of J. N. Ceazan Co., a Pacific Coast distributor for nationally known appliances, radios, television, tires and related products. He had previously been director of distribution for the Crosley Division, Avco Mfg. Corp., and started his career in the appliance business with Nash-Kelvinator Corp. as district manager.

—o—

A. C. Spurr, president, Monongahela Power Co., has been elected a member of the board of directors, **Wheeling Steel Corp.**, Wheeling, W. Va.

—o—

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., in an expansion of its sales organization, announces promotion of **C. S. French,** central division sales manager with headquarters in Cleveland, to a newly established post as assistant general sales manager, in which position he will be concerned primarily with development and specialty sales activities in connection with newer products and with Kaiser Aluminum building products. **J. W. Watson Jr.** was promoted to central division sales manager, Cleveland; **T. J. Gerber,** to Seattle district sales manager; and **J. W. Johns,** to Minneapolis sales representative. Other appointments are: **A. A. Throckmorton,** manager, pig, ingot and billet sales; **C. M. Kinghorn,** product manager for rolled form sections; and **J. M. Welch,** manager of contract sales. The latter two head new departments in the Kaiser Aluminum sales headquarters at Oakland.

FRANK D. MUMFORD

Frank D. Mumford has been appointed parts sales manager of **E. W. Bliss Co.**, Detroit, manufacturer of stamping presses, rolling mills and container machinery. Prior to this position Mr. Mumford had spent 23 years in parts engineering and sales work for Bliss and its Toledo, O., division.

—o—

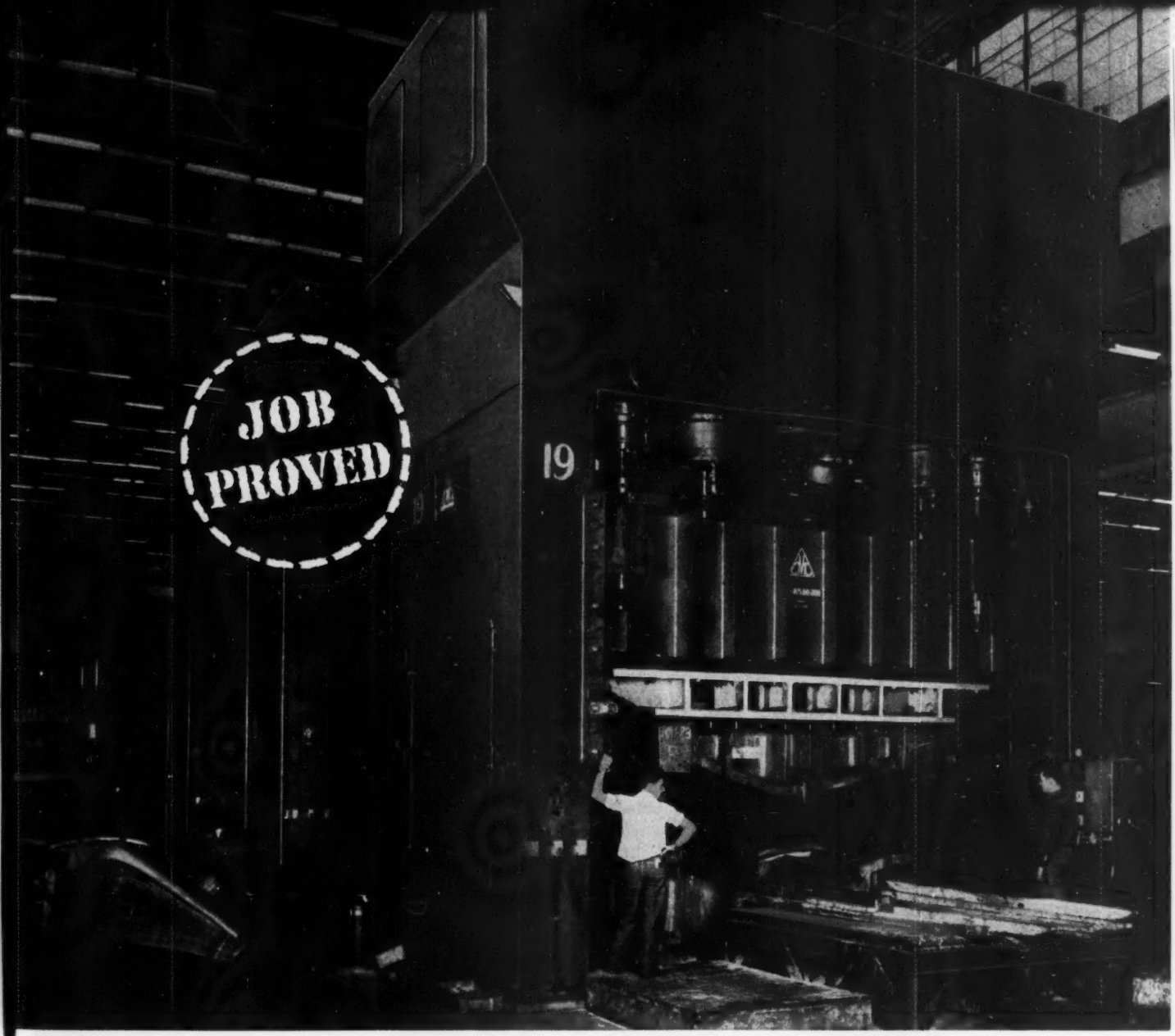
Paul J. Havas has been appointed manager of the foreign distributors division of **Willys-Overland Export Corp.**, subsidiary, Willys-Overland Motors Inc., Toledo, O. He has had 17 years' experience in the export field, and was formerly with Weber Co., Los Angeles, as export manager, and Montgomery-Ward, Chicago, as manager of the farm machinery department of the export distributors division.

—o—

Hanson - Van Winkle - Munning Co., Matawan, N. J., announces advancement of two members of its laboratory staff, **Dr. D. Gardner Foulke** and **Thomas J. Menzel.** Dr. Foulke has been appointed chief chemist in charge of analysis and customer service. He has held the post of process electrochemist for the last three years and continues to be responsible for a number of the company's special processes. Mr. Menzel has been appointed plating chemist. For the past several years he has been in charge of analytical work and customers' service work. In his new position he will be responsible for all experimental and process plating in the company's new plating laboratory.

—o—

Maxwell R. Sacra has been elected a director of **Black & Decker Mfg. Co.**,



SUNVIS GOING STRONG AFTER 3,500 HOURS

Body-Stamping Presses Still in A-1 Condition; Make-Up Oil Amounts to Only 1% per Month

One of the best-known automobile manufacturers selected Sunvis to lubricate three brand-new body-stamping presses. This equipment involved a big investment, and the company wanted the finest protection available.

After 15 months' use, the oil was tested and found to be in virtually the same condition as at the start. The machines were carefully examined and proved to be as good as new. The original charge of Sunvis is still in service and make-up oil has amounted to only one percent per month.

Because of performance like this, "Job Proved" Sunvis Oils are in wide demand wherever the finest lubrication is needed. They have high stability over a wide range of speeds, loads, and temperatures. You can count on Sunvis Oils for top performance and the surest protection of your machines. For full information call your nearest Sun Office.

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Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY

SUNOCO®

Towson, Md., to replace **Harry O. Norris** who resigned from the board several months ago. Mr. Sacra, who is export manager of the company, has been a member of the Black & Decker organization since 1927.

—o—

R. Ewart Stavert of Montreal, Canada, has been elected a director of **International Nickel Co. of Canada Ltd.** He is president of Consolidated Mining & Smelting Co. of Canada Ltd.

—o—

Jacob Morrison, president of **Morrison Steel Products Inc.,** Buffalo, since the company was incorporated in 1920, has been elected to the new position of chairman of the board. His son, **Samuel Morrison,** executive vice president for the last ten years, has been elected president.

—o—

James F. Clark, treasurer, American Car & Foundry Co., New York, has been elected treasurer of **Shippers' Car Line Corp.,** a subsidiary of ACF. Mr. Clark succeeds **J. F. Varcoe,** who has retired after 33 years' service.

—o—

E. O. Thomson, for many years with Carnegie-Illinois Steel Corp., is now associated with **Bushwick Iron & Steel Co. Inc.,** Brooklyn, N. Y.

—o—

William E. Ireland has been appointed vice president for sales of **International B. F. Goodrich Co.,** subsidiary, B. F. Goodrich Co., Akron, and **Bernard M. Costello** has been named vice president for manufacturing. Mr. Ireland was formerly merchandise manager, International Goodrich, and Mr. Costello was previously vice president and factory manager of B. F. Goodrich Rubber Co. of Canada Ltd.

—o—

Frank T. Merkel has been appointed district manager for **Bethlehem Supply Co.** of California in the San Francisco area. He replaces **J. R. B. Freeman,** who has been promoted to general manager of stores with headquarters in Los Angeles.

—o—

Frank Kazda has been appointed vice president in charge of purchasing for **Admiral Corp.,** Chicago. He has been associated with the organization since 1934 in various executive capacities.

—o—

George S. Forbes has been appointed manager, industrial sales division, **Glidden Co.,** Cleveland. He succeeds **Edward C. Shurtleff,** who has retired after 46 years' service with the company. Mr. Forbes has been serving as assistant to Mr. Shurtleff since July. He joined Glidden in 1939. Following service in the U. S. Navy during World War II, he was industrial salesman in the Detroit territory.

—o—

Paul R. Duffey, power engineer for **Youngstown Sheet & Tube Co.,** Youngstown, has been elected a Fellow of the American Society of Mechanical Engineers.

—o—

Warren Foundry & Pipe Corp., New York, has elected as members of its board **George M. Tisdale,** vice president of United States Rubber Co., and **Thomas R. Walker,** vice president of Warren.

—o—

Dr. Clifford Houston, on leave from the University of Colorado, has been named assistant to the president of **National Motor Bearing Co. Inc.,** Redwood City, Calif.

—o—

American Coach & Body Co.'s California division at Oakland announces the following promotions: **E. L. Hackett Jr.** has been appointed district supervisor at Portland, Oreg., succeeding **T. R. Hall,** transferred to Oakland as district supervisor, and **L. F. Linn** has been named purchasing agent. **F. C. Hall** has been appointed director of sales for the entire company, and will divide his time between Oakland and Cleveland.

—o—

Leo F. Brown has been appointed plant manager of the air conditioning equipment plant of the air conditioning department, **General Electric Co.,** at Bloomfield, N. J. He was previously associated with Houdaille-Hershey Corp., serving as manager of the Detroit plant. **Edward D. Kemble** was appointed plant manager of the air conditioning department's automatic heating division at Bloomfield. He formerly was plant manager of the Battle Creek, Mich., lift truck plant of Clark Equipment Co.

—o—

Sheffield Steel Corp., Kansas City, Mo., announces changes and promotions in its purchasing departments in the following divisions. Kansas City Division: **H. L. Kenagy,** purchasing agent for miscellaneous materials and supplies since 1937, will have charge of all purchasing (except scrap and pig iron) for the division; **W. M. Alexander,** supervisor of general stores and raw materials, was promoted to assistant purchasing agent in charge of raw materials and stores; **R. L. Barton** will continue as assistant purchasing agent in charge of miscellaneous materials and supplies; and **R. W. Duncan** was promoted from assistant purchasing agent to manager of scrap purchases, and will have charge of all scrap and pig iron purchases for the Houston, Kansas City and Sand Springs Divisions. Houston Division: **J. A. Street** has been appointed purchasing agent in charge of all purchasing (except scrap) for the division. He has served as supervisor of raw materials and acting purchasing agent, and will continue to serve as supervisor of raw materials. **G. R. Major** will serve as assistant purchasing agent in charge of raw materials and stores; and **D. J. Weaver** will be in charge of purchases of miscellaneous materials and supplies. Sand Springs Division: **W. C. McCarthy** will continue to serve as purchasing agent for the division.

—o—

F. T. Isaacson, former vice president, Young Iron Works, Seattle, has been appointed manager of the Seattle branch of **Howard Cooper Corp.**

—o—

Walter H. Aldridge, president, **Texas Gulf Sulphur Co.,** has been presented the John Fritz Medal for 1949, spon-

LEO F. BROWN

EDWARD D. KEMBLE

MEEHANITE® Properties · make this machine BETTER, STURDIER, FASTER

H. W. BUTTERWORTH & SONS CO., Philadelphia, are leading builders of a large line of textile industry equipment. Castings for their machinery are produced in their own Meehanite foundry. Their designers and engineers build in quality by utilizing from the beginning the better engineering characteristics available in the various types of Meehanite castings produced.

The photograph shows a Butterworth Compartment Washer and also indicates the variety of Meehanite castings used in every compartment.

To the equipment they provide higher vibration absorption properties; better strength characteristics; freedom from fear of hidden defects which might result in failure; in all,—a combination of those characteristics so important to builders of all types of equipment.

Write for Bulletin No. 32 entitled "Meehanite Quality Control Assures Uniform Dependability" to any of the foundries listed.

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American Brake Shoe Co. — Mahwah, New Jersey	Fulton Foundry & Machine Co., Inc. — Cleveland, Ohio	Pohlman Foundry Co., Inc. — Buffalo, New York
The American Laundry Machinery Co. — Rochester, New York	General Foundry & Manufacturing Co. — Flint, Michigan	Rosedale Foundry & Machine Co. — Pittsburgh, Pennsylvania
Atlas Foundry Co. — Detroit, Michigan	Greenlee Foundry Co. — Chicago, Illinois	Ross-Meehan Foundries — Chattanooga, Tennessee
Banner Iron Works — St. Louis, Missouri	The Hamilton Foundry & Machine Co. — Hamilton, Ohio	Shenango-Penn Mold Co. — Dover, Ohio
Barnett Foundry & Machine Co. — Irvington, New Jersey	Johnstone Foundries, Inc. — Grove City, Pennsylvania	Sonith Industries, Inc. — Indianapolis, Ind.
H. W. Butterworth & Sons Co. — Bethayres, Pennsylvania	Kanawha Manufacturing Co. — Charleston, West Virginia	Standard Foundry Co. — Worcester, Massachusetts
Continental Gin Co. — Birmingham, Alabama	Koehring Co. — Milwaukee, Wisconsin	The Stearns-Roger Manufacturing Co. — Denver, Colorado
The Cooper-Bessemer Corp. — Mt. Vernon, Ohio and Grove City, Pa.	Lincoln Foundry Corp. — Los Angeles, California	Traylor Engineering & Mfg. Co. — Allentown, Pennsylvania
Crawford & Doherty Foundry Co. — Portland, Oregon	E. Long Ltd. — Orillia, Ontario	Valley Iron Works, Inc. — St. Paul, Minnesota
Farrel-Birmingham Co., Inc. — Ansonia, Connecticut	Otis-Fensom Elevator Co., Ltd. — Hamilton, Ontario	Vulcan Foundry Co. — Oakland, California
Florence Pipe Foundry & Machine Co. — Florence, New Jersey	The Henry Perkins Co. — Bridgewater, Massachusetts	Warren Foundry & Pipe Corporation — Phillipsburg, New Jersey

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sored by the American Institute of Mining & Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, and American Institute of Electrical Engineers.

—o—

Walter W. Kemphert has been ap-

WALTER W. KEMPHERT

pointed vice president in charge of sales, **Maurey Mfg. Corp.**, Chicago. He has assumed direction of all sales and distribution of Maurey power transmission equipment. Formerly with Worthington Pump & Machinery Corp., Harrison, N. J., as manager of the merchandising division, he later was vice president of sales at Skilsaw Inc., Chicago.

—o—

Sherman M. Goble has been appointed manager, plating and electrochemical department, **Federated Metals Division,** American Smelting & Refining Co., New York. Federated's activities in the plating industry were expanded with the recent acquisition of the anode facilities formerly owned by Metallurgical Products Co., Philadelphia. The new department, under Mr. Gobel, has been organized to facilitate sales and service. Mr. Gobel has had many years of experience in the plating field. Before joining Federated he was with Seymour Mfg. Co., Seymour, Conn.; McGean Chemical Co., Cleveland; and most recently with Lea Mfg. Co., Waterbury, Conn.

—o—

National Association of Steel Exporters Inc., New York, has elected as directors **Marcel Loeb, Ralph Michaels, Walter Meyer, Kurt Orban,** and **Herbert Winter.**

—o—

J. P. Coughlin has been appointed manager of field sales, welding department, **Westinghouse Electric Corp.**, at Buffalo, N. Y. He joined Westinghouse upon graduation from the University of Missouri in 1939, and subsequently served as welding sales engineer for the southwestern district with headquarters in St. Louis. In 1942 he was commissioned in the Navy, serving as officer in charge of welding construction at several shipyards. In 1945 he returned to Westinghouse as manager of welding products, agency and specialty sales department, East Pittsburgh. He held this position until his new appointment.

—o—

Menasco Mfg. Co., Burbank, Calif., announces appointment of **J. I. Hamilton** as general sales manager. Mr. Hamilton replaces **B. C. McNeill,** who has resigned. Mr. Hamilton was with Curtiss-Wright Corp. for ten years and held the position of assistant sales manager for the last five years.

—o—

J. D. Harbaugh, plant manager,

J. D. HARBAUGH

Chevrolet-Detroit Gear & Axle Division, has been appointed manager of Detroit plants for the **Chevrolet Motor Division,** General Motors Corp. Detroit plants include both Detroit Gear & Axle and Detroit Forge Divisions. Other changes in the responsibilities of members of the Chevrolet management group are: **R. W. Podlesak,** plant manager of the Chevrolet assembly plant at Janesville, Wis., succeeds Mr. Harbaugh as plant manager, Detroit Gear & Axle Division; **J. L. Coyle,** plant manager, Chevrolet-Muncie Division, succeeds Mr. Podlesak at the Janesville plant; **A. R. Roskilly,** general superintendent of production, Detroit Gear & Axle Division, succeeds Mr. Coyle as plant manager of the Muncie operation; **I. B. Scofield,** general superintendent, Chevrolet-Flint Mfg. Division, is assigned to special duties there; **B. D. Marshall,** plant manager, Chevrolet-Detroit Forge Division, is now assistant manager, Flint Mfg. Division; **F. C. Hillman,** plant manager, Motor Division at Flint, will succeed Mr. Marshall as plant manager, Detroit Forge Division; **M. W. Clark,** on special assignment at the Flint Mfg. Division, succeeds Mr. Hillman.

—o—

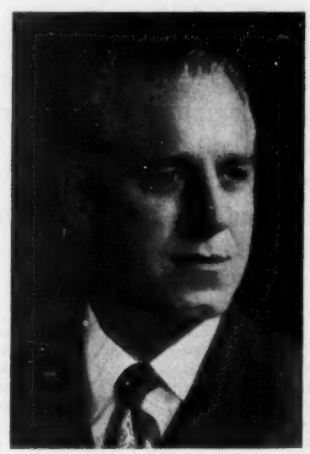
William A. Casler has been named assistant director of research at **Armour Research Foundation** of Illinois Institute of Technology, Chicago. Mr. Casler joined the foundation staff in 1946 as a research engineer after serving four years in that capacity at Caterpillar Tractor Co. in Peoria, Ill. He will be in charge of stimulating new fields of research and will assist in the administrative operation of the research division. **K. W. Miller** continues as assistant director of research in charge of technical and professional development.

—o—

Craig R. Sheaffer has been elected to the board of directors of **Keokuk Electro-Metals Co.**, Keokuk, Iowa, producer of silvery pig iron, with plants at Keokuk and Wenatchee, Wash. Mr. Sheaffer is president and director of W. A. Sheaffer Pen Co., Ft. Madison, Iowa, a director of Northwestern Bell Telephone Co., and has also been actively associated as an officer and director of many national and state business and civic organizations.

—o—

Harry H. Beyma has been appointed manager of cold rolled sales for



HARRY H. BEYMA

Kaiser Steel Corp., Oakland, Calif. He has been with Kaiser Steel since 1944 as a sales representative in southern California. He will retain offices in Los Angeles. Before joining Kaiser Steel Mr. Beyma was affiliated for 13 years with Republic Steel Corp.

D. J. Davis, veteran automotive production engineering executive, has been appointed director of manufacturing engineering, **Ford Motor Co.,** Dearborn, Mich., succeeding **Roy T. Hurley,** who resigned to become president of Curtiss-Wright Corp. **Alex Hunter,** manager of Ford's Ypsilanti, Mich., plant, has been appointed plant manager of the company's newly acquired unit at Monroe, Mich., a former manufacturing unit of Kelsey-Hayes Wheel Co., which was purchased last October and becomes a member plant of Ford's parts and equipment manufacturing division. Mr. Hunter will continue his duties at Ypsilanti until final plans for operation of the Monroe plant's facilities have been completed. Mr. Davis began his association with the automotive industry in 1922 when he joined the Cadillac Division of General Motors Corp., serving for 21 years as a staff member of the production engineering department. He joined Avco Mfg. Corp. in 1942 as master mechanic of American Propeller Corp., Toledo, O. Following other executive posts with Avco he became, in 1948, chief industrial engineer for Avco, his last post before joining Ford. **D. P. Cromwell** has been named assistant manager of

D. J. DAVIS

ALEX HUNTER

Ford Motor Co.'s blast furnace and coke oven division at River Rouge, Mich. He formerly served as superintendent, Hubbard and Campbell blast furnaces of Youngstown Sheet & Tube Co.

—o—

E. A. Olson, in charge of metal advertising for **National Lead Co.,** New York, was honored by his associates at a luncheon observing his 35th anniversary of company service.

—o—

Philip Ryan, since 1945 vice president in charge of manufacturing at **Cutler-Hammer Inc.,** Milwaukee, has been elected a member of the electrical control firm's board of directors.

—o—

Vernon L. Mattson has been appointed director of **Colorado School of Mines Research Foundation Inc.,** Golden, Colo.

—o—

D. W. Wilson, Detroit district manager for **H. A. Wilson Co.,** Newark, N. J., metal refiner, has been named general sales manager of the company.

OBITUARIES...

William E. O'Connor, 75, for 42 years associated with **Cleveland Automatic Machine Co.,** Cincinnati, died Nov. 14 following a heart attack. He became associated with the company in 1906, and his first assignment was in the testing department. He later was promoted to service engineer in the New York territory, and held that position until he retired in 1947.

—o—

Hugo M. Marquette, 65, veteran sales representative of the steel casting industry, died in Milwaukee Nov. 28. He was manager of the Chicago district sales office for **Grede Foundries Inc.** for the last ten years, and associated with the company since 1937. For 25 years previously he had been with George H. Smith Steel Casting Co. as production manager and sales manager. The Smith firm was acquired by Grede Foundries in 1942.

—o—

Carl R. Dick, 65, director and retired vice president of **Mississippi Valley Structural Steel Co.,** Decatur, Ill., died Nov. 29. Following graduation from the University of Illinois in 1907 with a degree in architectural engineering, Mr. Dick remained at the university as an instructor in engineering until 1910, when he entered the employ of Decatur Bridge Co. In 1922 when the company name was changed to Mississippi Valley Structural Steel Co., he was appointed manager of the Decatur plant. He served as secretary of the company from 1922 to 1925, and as treasurer from 1934 to 1944. He retired from active duty in 1944 but remained as vice president and a director.

—o—

William H. Schellhammer, 45, vice president and purchasing agent for **Hammond Iron Works,** Warren, Pa., prior to his retirement in 1946, died Nov. 25.

—o—

C. J. Heale, 49, president, general manager and publisher of *Hardware Age,* died Dec. 1.

—o—

Carter S. Cole, assistant technical secretary of the **American Society for Testing Materials,** died in Philadelphia Nov. 17. He was on the staff of the ASTM since October, 1944. Following service in the Navy during World War I, Mr. Cole was with Copper & Brass Research Association, 1928 to 1942, when he went with the War Production Board in Washington and was appointed chief of the metals branch, conservation division.

—o—

Dr. Hobart C. Dickinson, 74, inventor, physicist and former chief of the division of heat and power, **Federal Bureau of Standards,** Washington, died Nov. 27. He built the first altitude chamber for testing airplanes. In 1921 he helped organize the Society of Automotive Engineers, and in 1933 became its president.

—o—

Cornelius P. Crowley, 47, an accounting executive with **Jenkins Bros.,** New York, valve manufacturer, died Nov. 29. He had been associated with Jenkins Bros. for 28 years.

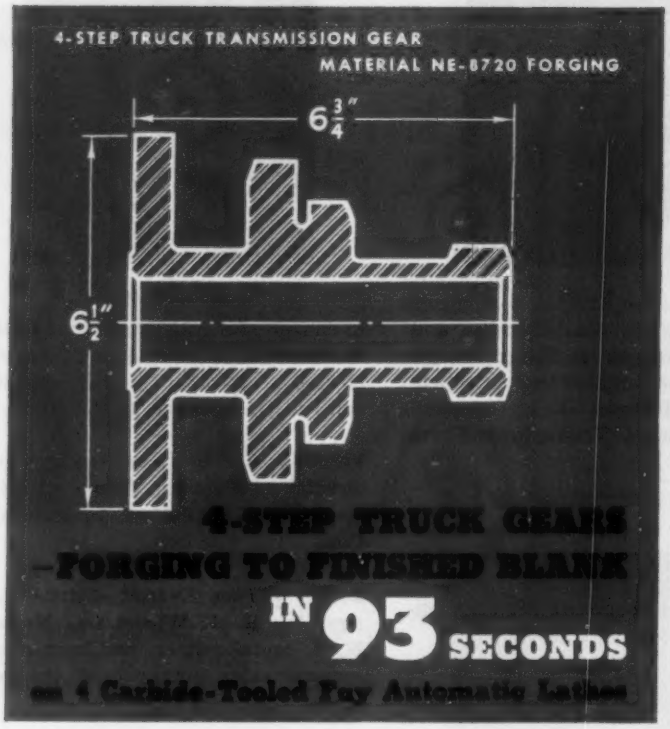
—o—

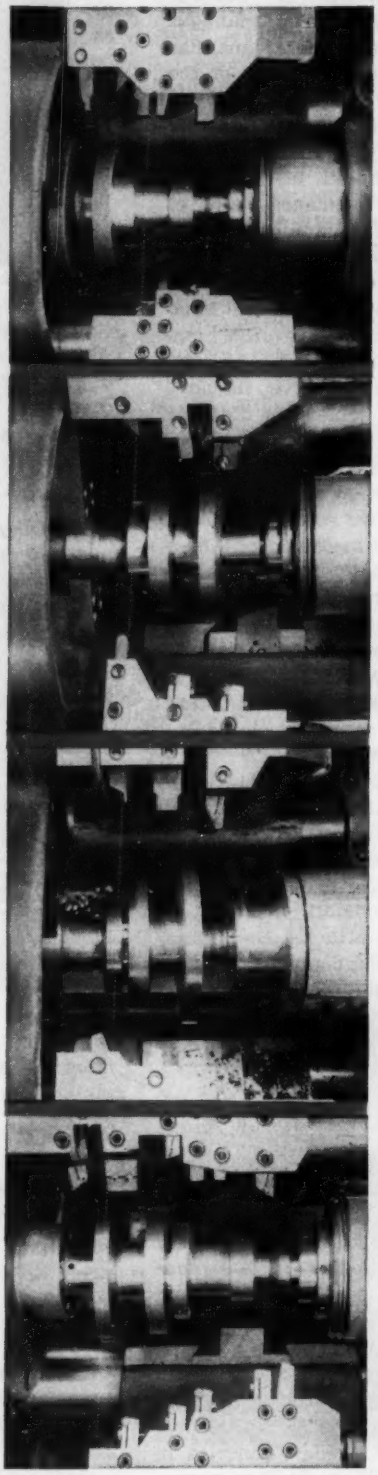
Thomas A. Contryman, 61, former factory manager of the old **H. H. Babcock Carriage Mfg. Co.,** Watertown, N. Y., producer of automobile bodies, died Nov. 29 in Oswego, N. Y.

—o—

Robert B. Webb, 71, veteran sales representative of **Keystone Steel & Wire Co.,** Peoria, Ill., was killed in an automobile accident Nov. 22 near Bridger, Mont. He had been associated with the company since 1926, and was sales representative in the Montana territory for many years.

DO YOU COMPETE AGAINST PRODUCTION LIKE THIS ?





24 SECONDS 1st operation

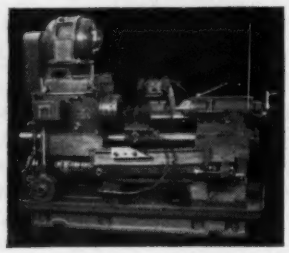
28 SECONDS 2nd operation

18 SECONDS 3rd operation

23 SECONDS 4th operation

This 4-operation gear job is a striking example of production turning on the Fay Automatic Lathe. Every tool has either a brazed or an insert-type carbide tip. Approximately 68 HP is transmitted during the first operation! Surface speeds range from 450 to 660 FPM. The blanks are completely turned, faced, formed and grooved, with every important surface held true and concentric . . . Moreover, these 4 machines are doing the work formerly done by 17!

Why not write us for more details? Let us show you why it's cheaper to own a Fay than to compete against one!



Our new 16" Fay Catalog contains many other examples of high production turning. Write to Dept. 710F for your copy.

DESIGNED To lower every turning cost. ***BUILT*** For maximum production with either carbide or high speed steel tools. ***POWERED*** To produce more chips per tool, more pieces per hour, more profit per job . . . than any automatic lathe of comparable range.

Fay Lathe Division

J&L JONES&LAMSON MACHINE COMPANY
Springfield, Vermont, U.S.A.

MACHINE TOOL CRAFTSMEN SINCE 1835

Production AND Engineering
NEWS AT A GLANCE

WIRING OUTPUT DOUBLED— Completely revamped setup of assembly wiring harnesses for aircraft developed by Glenn L. Martin Co., Baltimore, is currently cutting unit production time in half. Besides reducing assembly time by 45 hours per unit, new method is providing better uniformity of workmanship by reducing operator fatigue. Secret of the setup is a harness board which enables an operator to wire the entire assembly out in the open—for subsequent installation as a unit into the frame of the electrical shelf. Mounting of the board on an easel enables it to be tilted, bringing parts within easy reach of the operator at all points.

"SCOOP" HANDLING— Method of feeding cap screws to three electric furnaces is one of the reasons why Cleveland Cap Screw Co., Cleveland, is able to do trouble-free, 12-ton daily heat treating job. The furnaces, capable of putting through 1000 pounds of screws per hour each, are fed by an overhead-hoist-conveyed tapered "scoop" that resembles a coal chute. High-speed production from 35 basic machines is guided directly to the three heat treating units where they are picked up by the "scoop" and poured into each furnace hopper. An automatic vibratory-feed insures even distribution of the screws on the furnace conveyor.

MORE COLOR DATA FOR PAINTS NEEDED—Recent work at National Bureau of Standards, Washington, indicates that the fundamental data on color mixture, accepted internationally since 1931 for interpreting colorimetric measurements, may need to be revised. The bureau's work corroborates findings from three other laboratories in this country, Harvard, Eastman Kodak Co., and National Lead Co. Also considerable interest was aroused by a report from Titanium Division of National Lead that the data were not adaptable to the colorimetry of titanium-pigment paints. Further studies are now being made, but until a revision is made officially by an international body, present color standards will be observed.

COUNTS SPRAYED LIQUID DROPS— The thousands of liquid drops shot out of a spray nozzle now can be automatically sorted, counted rapidly and accurately by means of a new electronic device. Developed by two men from the University of Wisconsin, the unit is reported to be a practical valuable addition to both chemical and engineering industries. It can be very useful, for example, in stepping up the efficiency of an engine by adjusting the uniformity of the fuel spray injected in each cylinder.

ATOM "BLOODHOUND"— A high-speed device that can turn ultraviolet light on or off in less than one millionth of a second is being used by Westinghouse scientists to measure short term life of radiation. For example, when light strikes a tube filled with mercury vapor—like that in a fluorescent tube—the atoms inside the tube catch this radiation, become excited and re-emit the same light. The apparatus measures the number of times the radiation is tossed from atom to atom before escaping from the tube. According to the Pittsburgh company, knowledge gathered in the work may lead to improvement in various types of electronic tubes and switches, and possible discovery of new ways of producing light.

NEW FINISHING TOOL—Vacuum technique for applying thin metallic coatings to metal and nonmetallic surfaces holds promise of developing into an important industrial tool. Almost invariably, surfaces produced by the process provide greater brilliance than depositions applied either by electrolysis or as paint. Furthermore, they are produced without extra hand finishing or buffing if the original surface is in fairly good condition. Any substance which retains its solid state, and does not have too high a vapor pressure under vacuum can be coated by the method. (p. 84)

LOW COST WELDING—Inert gas-shielded arc welding process is inherently suited to requirements of the automotive industry because high quality welds can be made at high speeds with no slag or spatter, controllable distortion and low cost. Its concentrated high temperature permits joining operations to proceed at a rapid rate with very little dissipation of heat into areas surrounding the weld. However, successful application of the method depends a great deal on fundamentals of fixture design. Some important considerations of a good fixture are outlined by two Linde authorities in this issue. (p. 88)

DETERMINATIONS AT WILL— New method of producing high temperatures applicable to carbon and sulphur determinations is radio frequency induction heating. It not only provides operating temperatures exceeding 3000° F, but also reduces determination time from 10 to 2½ minutes. Because only 1 minute preheat time is required, the method offers considerable flexibility in laboratories where sulphur analyses are performed on an intermittent basis. (p. 92)

THE "ORE HIGHWAY" — Modern handling of iron ore from the mines of the upper lakes region to the unloading docks presents a far different picture from that of early days. With ever increasing demand for more iron ore to keep blast furnaces glowing came increased size of ships, faster loading and unloading equipment and improvement of harbors and waterways. Today, tonnages moved on the Great Lakes are unbelievable. In one season, they exceed the combined shipping of Atlantic, Gulf and Pacific coasts. (p. 96)

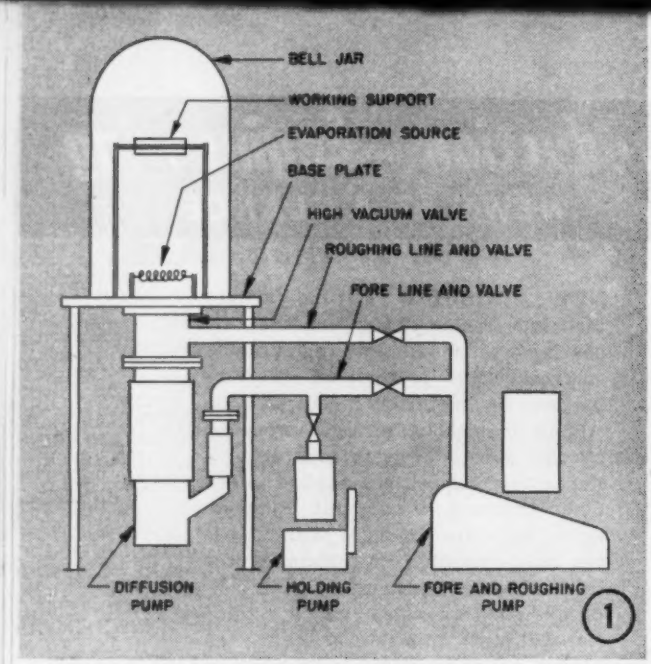


Fig. 1—Typical setup for applying evaporated metallic coatings. Large commercial units employ the same basic technique. Courtesy National Research Corp.

How To Apply METAL COATINGS BY VACUUM EVAPORATION

High vacuum techniques for applying thin metallic coatings to metal and nonmetal surfaces are developing into an important industrial tool with many applications in manufacturing industries

VACUUM technique for the application of metal coatings on an industrial scale, although a relatively new tool, has already taken an important place in a wide range of operations. It has opened up entirely new fields. The use of the metal evaporation technique for applying thin metallic coatings to metal and nonmetallic surfaces holds promise of developing into an important industrial tool.

Vacuum coating can be used advantageously for many good reasons. Almost invariably, surfaces produced by this process have greater brilliance than depositions applied either by electrolysis or as a paint. These surfaces are produced without extra hand finishing or buffing, provided the finish of the original surface is in satisfactory condition. Extremely thin films may be formed; metals can be applied to nonconductors without resorting to special chemical or physical treatments. Materials can be coated which could not otherwise be coated if high temperatures or chemically destructive compounds were required as is the case in some other processes. One metal can be deposited on another that is far removed from it in the electro-chemical series—thus, gold or platinum can be deposited directly on aluminum or magnesium.

Vacuum coating is economically feasible—as indicated by its use for imparting a gleaming metal surface to hair barrettes and costume jewelry. It may be applied to many surfaces, such as glass, plastics, paper, metal, crystals, cloth—in fact, any substance which retains its solid state and does not have too high vapor pressure under high vacuum. Other recent uses for evaporated metal coatings include molded plastic parts for decorative purposes such as Christmas tree decorations, automobile horn buttons, and plaques. Thin plastic sheeting can be coated with metals. Aluminum and silver coatings on glass and plastic parts have been reported to reflect well over 80 per cent of the incident light. For other uses, alloys and elements such as tellurium, silicon and selenium can be deposited on a surface in very thin layers.

Many Materials Used—In general the coating substance may be one of a large number of materials. Many metals, metallic salts and alloys have been used successfully. The choice of material depends on the results desired. Some of the substances now in use include aluminum, copper, gold, Inconel, magnesium fluoride, nickel, silver, and zinc.[1] One manufacturer uses vacuum coating to deposit pure gold in the recesses that form the initial in plastic inserts for tie clasps. It was reported that use of the vacuum process in regular production gave a finished product measurably superior to the former which had been made by painting with a spray gun, and at no increase in cost. Automobile manufacturers use this same method to prepare brilliant metallized plastic parts for steering wheels and dash panels. The brilliant luster of evaporated metal adds much to the attractiveness of emblems and insignia for radios

refrigerators, and other household appliances.

The fact that metal coatings can be deposited on a great many plastics of both thermosetting and thermoplastic types has opened up many potential uses in both decorative and industrial fields.[2] Table I lists typical plastic types amenable to metallizing by vacuum evaporation. Molded parts such as equipment nameplates, appliance escutcheons, and similar articles are adapted to the process. The design in such pieces is usually molded in the back surface, and all or part of the design can be metallized by masking techniques. A backing paint or lacquer is used to protect the film.

The metal film deposited in this way has been reported to have higher reflectivity and brilliance than metal effects achieved by use of metal paints. The three-dimensional effect of the design is greatly enhanced by the metal film. Metal films can be deposited on the front surface of molded plastics and then overcoated with a transparent lacquer to give necessary protection against normal handling. When the metal appearance alone is desired, a clear lacquer is used. Interesting effects have been reported where dyed lacquers have been used over the metal film to give metallic colors.

In the electrical field, evaporated metal films have found applications in capacitors, using silver coatings

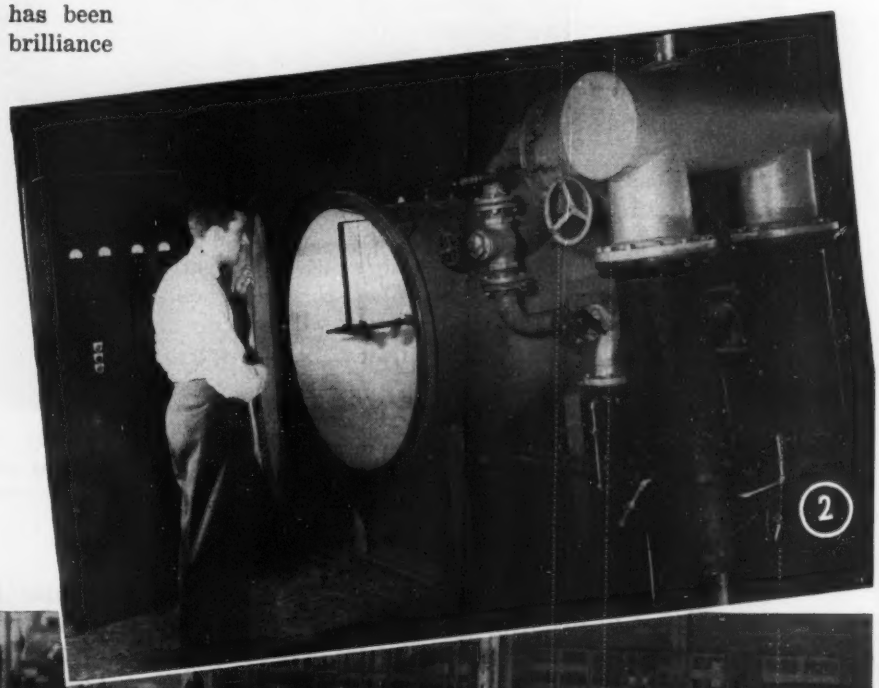
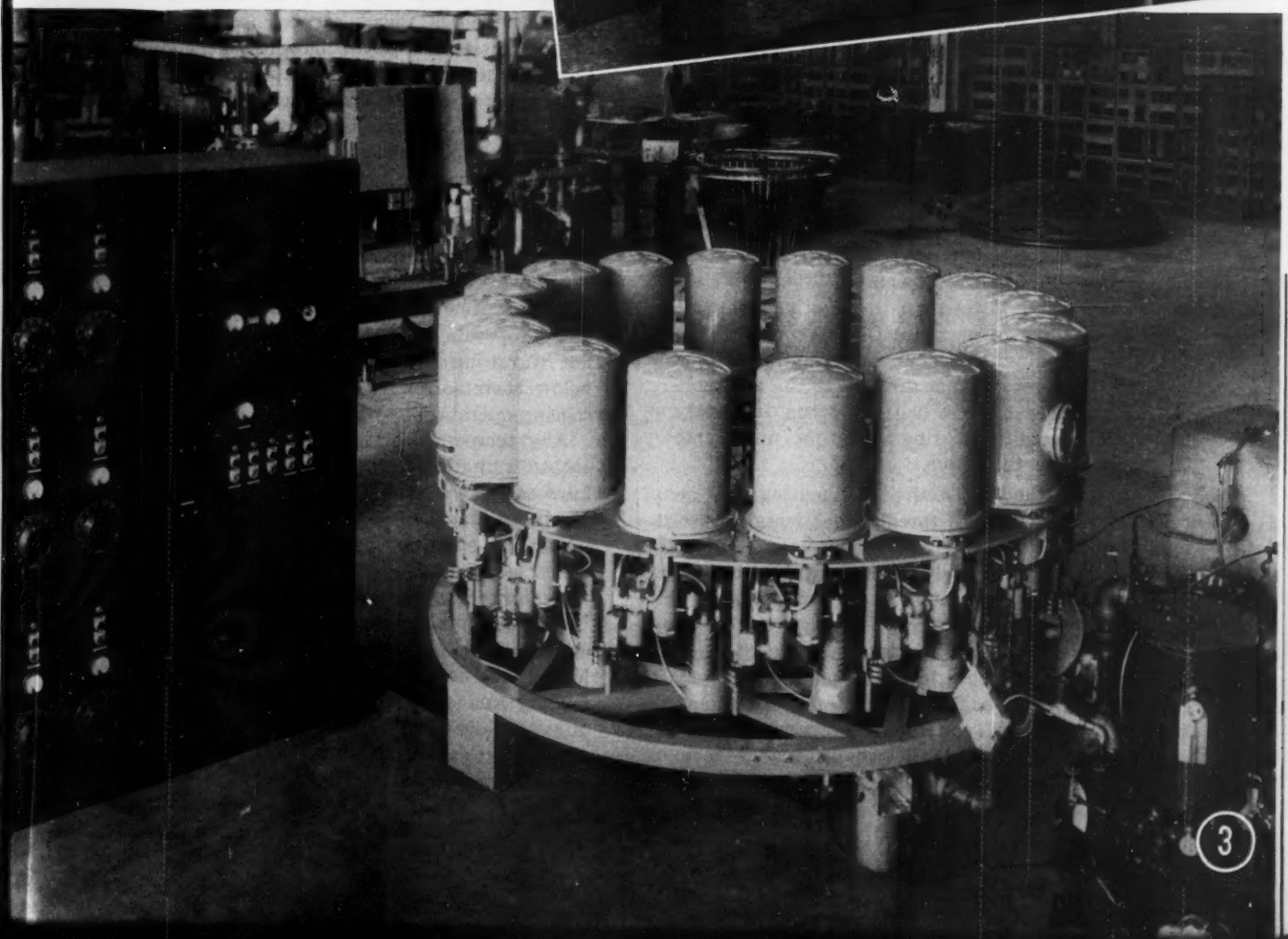


Fig. 2—Pumps, control panel and vacuum chamber of a large National Research Corp. evaporator in which metallizing operations are carried out

Fig. 3—For mass production of small coated objects this fully automatic rotary coating machine was developed by Distillation Products Inc. The machine can be handled at one station by one operator. Automatic devices carry out all operations



on mica and zinc or aluminum coatings on paper; gold evaporated films have been used to load quartz crystals to a definite oscillating frequency; and silver films have been deposited on quartz crystals to provide a base for making soldered contacts.

Enough progress has been made in the use of vacuum coating methods in the manufacturing field to indicate that the process can be introduced into many industries as a standard production tool, and in many cases it can produce a better product at lower cost. Another important point that has been proved is that regular equipment can be supplied for the process that can be depended upon to give trouble-free service over long periods without the need for skilled technical personnel. Additional uses will undoubtedly suggest themselves as designers and manufacturers become more familiar with the possibilities of this method of metallizing.

Limitations — Limitations of the process require that substances to be coated have a low enough vapor pressure to allow the vacuum system to produce a pressure of less than 1/10-micron, which is roughly one ten millionth of the pressure existing in normal atmospheric conditions. A wide variety of substances, including most of the plastics, fall into this category. Size of the objects to be coated is limited to the maximum dimension of the vacuum chamber.

Vacuum Evaporation Technique — According to information from the National Research Corp., manufacturers of vacuum coating equipment, there are three essential parts of a vacuum-evaporation apparatus, namely: (1) Pumping system which must be capable of evacuating the system to an absolute pressure of 10^{-4} to 10^{-5} mm of mercury; (2) means for heating the metal being evaporated up to its evaporation temperature; and (3) means for holding the work to be coated so that it will be properly exposed to the metal vapor.

The pumping system is composed of a combination of mechanical pumps and a diffusion pump. In evacuating the system, the mechanical pump is used to bring the system down to a pressure of 100-200 microns (1 micron = 0.001 mm) of mercury. This stage of the process is referred to as the "roughing" stage. A diffusion pump is then used to continue evacuation down to a pressure of about 0.1 micron. The diffusion pump requires a mechanical pump in series with it, since it cannot exhaust directly to the atmosphere. Fig. 1 shows a typical bell jar setup for applying evaporated metallic coatings. Larger units employ the same basic technique.

Heating Methods — Method of heating the metal being evaporated varies for different metals. A common method of heating the metal is by use of a filament of tungsten, molybdenum, tantalum or columbium which can be heated to incandescence by the passage of an electric current through the filament. The filament is sometimes in the form of a coiled wire, as in the evaporation of aluminum, or may be in the shape of a boat or crucible formed from ribbon or sheet. The metal being evaporated is placed on or in the filament and may be in the form of wire, pellets, or strip as convenience dictates for any given situation.

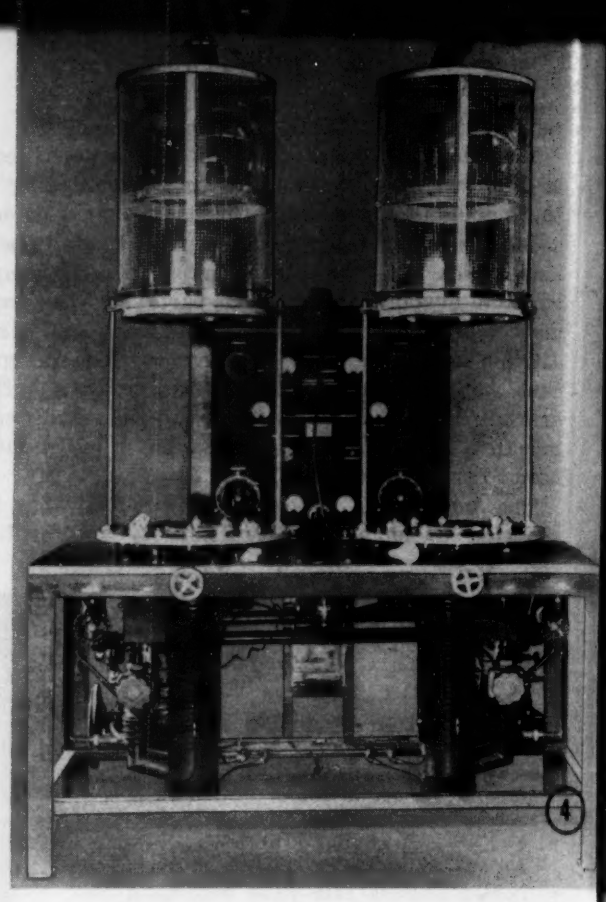


Fig. 4—Double evaporation unit for vacuum coating. One unit is loaded while the other is being evacuated. Courtesy Distillation Products Inc.

Table II shows typical evaporation temperatures for a few metals. Temperatures listed in the table are approximate and vary somewhat, depending on the rate at which the metal is evaporated. Use of higher temperatures speeds up the rate of evaporation.

Jigging—Method of jigging the objects to be coated is largely dependent on the article being coated. In the case of coating plastics, the work is usually held in the evacuating chamber at a distance of between 12 and 24 inches from the filament, especially in production practice. In small scale work it is frequently convenient to evaporate over a relatively short distance of a few inches. Despite the fact that the filaments operate at red-to-white heat, the work does not warm up excessively and most plastics remain below their softening or distortion point during the coating operation.

Any temperature rise in the plastic is due to absorbed radiation from the filaments, since there is no possibility of convection in a vacuum. Equipment coating units now are available in sizes adequate for industrial operations. Fig 2 shows a typical unit which consists of a cylindrical tank, 48 inches in diameter, 48 inches long. This unit can be evacuated by its pumping system in about 15 minutes. The evaporation itself requires about 1 minute, and releasing of the vacuum requires another minute. The loading and unloading time vary with the type of object being handled and the jigging procedure.

Rotary Coating Machine—For mass production of small coated objects, a fully automatic rotary coating machine has been developed by Distillation Products

Fig. 5—High vacuum evaporator which applies zinc coating to electrical condenser paper

Inc., another manufacturer of vacuum coating equipment. The standard unit, shown in Fig. 3 consists of 16 bell jars, 14 inches in diameter and 18 inches high, mounted on a turntable. Rough pumping and backing for the diffusion pumps is provided by two large mechanical pumps which are connected to the system by rotary seals. Each bell jar has a separate diffusion pump which is protected from atmospheric pressures by automatic high-vacuum valves.

The machine can be handled at one station by one operator; automatic devices carry out all operations. While one bell jar is being loaded, the previous one is rough-pumped by a mechanical pump, and ten are being pumped to high vacuum. In the subsequent positions, the filament is degassed, the charge of coating material is melted, and finally the metal is vaporized. At the last position, the bell jar is released to atmospheric pressure, unloaded, and made ready to receive a new batch of work and a fresh charge of coating material. One bell jar delivers a finished batch of work in 30 seconds to 3 minutes, depending on the volatility of the work being coated, and other factors. Thus, a total of 20 to 120 batches may be processed every hour. The number of pieces produced per hour depends, of course, on their size and shape. Production rates of several thousand high-quality pieces per day are being realized.

Fig. 5 shows another type of high vacuum metal evaporator designed by National Research Corp. which applies a coating of zinc to electrical condenser paper. Fig. 4 shows a double vaporation unit. A double unit can normally be handled by one operator, and one unit can be loaded while the other is being evacuated, thus saving production time.

Applications—It is generally not economically practical to evaporate films thicker than 0.001 mm for commercial uses. Also, heavy films have a tendency to peel off whatever material they are deposited on. For most uses, metal films of 0.001 mm or less are quite satisfactory since they are almost opaque. The metal film follows the surface contour of the base material. In the case of flexible materials, there is no stiffening of the material caused by the evaporated film. Since it is so thin, it is not possible to polish it to obtain shiny finishes. However, aluminum and silver coatings on glass, plastics either molded or extruded, and even highly calendered fabrics reflect well over 80 per cent of the incident light.

By the use of the electron microscope and electron diffraction patterns, many investigators have examined evaporated films. The observations reported vary considerably in details. However, it is generally agreed that the films consist of agglomerates formed by migration of the atoms due to surface forces after the atoms have condensed on the surface. Films are thought to contain some oxides of the evaporated metal. The largest concentration of oxide appears to be in the initial layer deposited plus whatever oxide forms on the surface upon exposure to the atmosphere.

Electrical Resistivity—Electrical resistivity of such films is higher than for massive metal. Extremely thin layers show almost infinite resistance up to a finite thickness where the resistivity drops tremendously. Probably the agglomerate structure of the film contributes to this. The resistivity of an evaporated aluminum film (*Please turn to Page* 115)

MULTIPLE-SECTION

Cut Auto Finishing Costs

By R. H. BENNEWITZ and F. J. PILIA
Supervisor of Process Service *Development Engineer*
The Linde Air Products Co., New York

APPROXIMATELY 2 years ago Linde introduced its inert gas-shielded arc welding process—Heliarc welding—to the automotive industry for the welding of two-piece fenders. This first successful application of the process resulted in its use on body joints, bumper guards, bumpers, and other accessory parts requiring metal finishing. The method results in higher quality parts, simplified dies, reduced finishing costs and improved surfaces for paint. Its expanded use promises to revise greatly automotive sheet metal joining procedure.

The process is inherently suited to the requirements of the automotive industry because high quality welds can be made at high speeds with no slag or spatter, a minimum of reinforcement, controllable distortion, and low cost. Its concentrated high temperature arc (approximately 6000° F) permits welding at a rapid rate with very little dissipation of heat into areas surrounding the weld. Simplicity of the torch and its limited size permit easy access to the rather confining fixtures employed with its use.

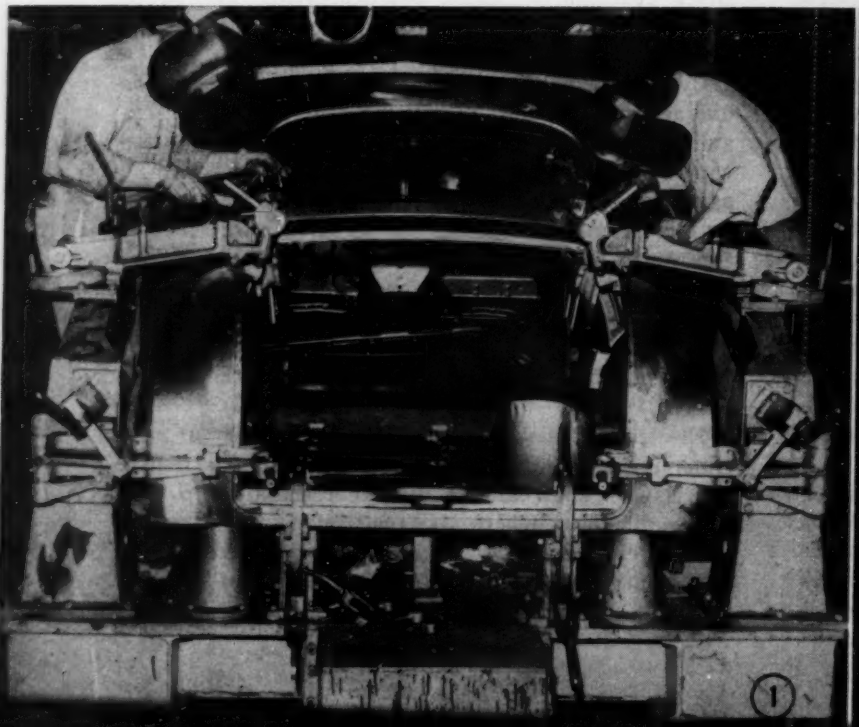
Fixture Requirements—The process in its successful application, requires careful attention to the fundamentals of fixture design. Basic functions of a good fixture are to assure proper alignment of the parts, limit distortion, provide a back-up for the weld and maintain dimensional tolerances. In order to fulfill the aforementioned requirements of a good fixture, the following points must be considered:

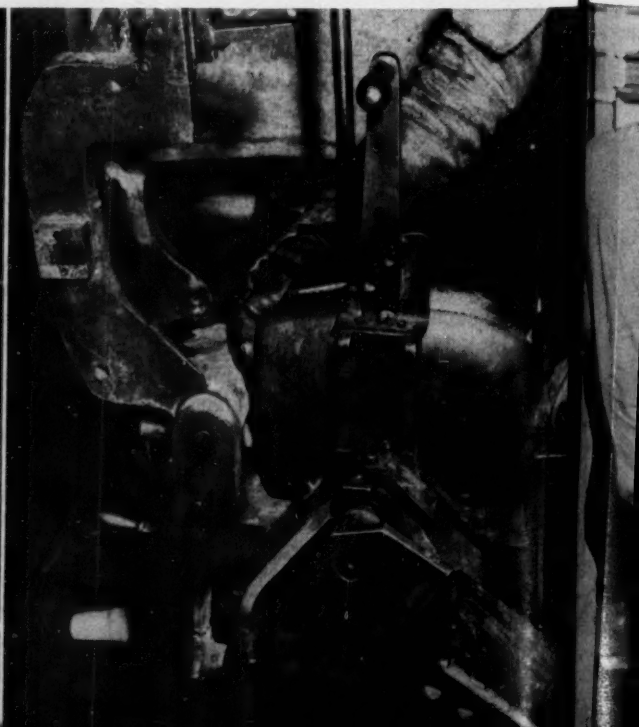
(1) Hold-Down Pressure—Upper section of the fixture clamps the parts down on the back-up bar. Pressure should be from 300-500 pounds per lineal inch per side for material under 0.050-inch thick. Furthermore, this pressure should be exerted over a 1-inch width along the weld line. A secondary contact area 1-inch wide is desirable, with the area between the contact areas being relieved.

(2) Contours—Because of the nature of automotive parts, most of the fixtures will require contoured back-ups matching contoured hold-downs. It is imperative that the fixtures be carefully spotted-in until accurate holding is obtained continually along the contact areas. Spotting-in is accomplished by the addition or removal of metal to areas indicated to be low or high upon trial clamping on actual

Fig. 1—Two operators simultaneously weld upper deck extension to quarter panels

Fig. 2—Loading bumper welding fixture. Mechanical linkage holds parts in alignment for welding





...N WELDED STAMPINGS

stampings. Final spotting-in must include the actual welding of parts in the fixture to determine the location of "hot" and "cold" areas. Fixtures for completely flat work are much less a problem since, if machining is accurate, there should be no need for spotting-in.

(3) Important Dimensions—Certain basic dimensions must be maintained on hold-downs and back-ups or the success of the process will be impaired. First of all, fixture parts must be structurally massive enough to resist distortion when holding pressure is applied. Secondly, dimensions indicated in Fig. 5 must be held, since empirical data have proved these dimensions critical.

(4) Materials Used—Strength members in the fixture are open to a choice of steel plate, cast steel or cast iron. The back-up bar should be beryllium copper and the hold-down should be either beryllium copper or aluminum bronze. Use of copper or wear-resisting copper alloys is necessary to aid in conducting heat from metal adjacent to the weld, thereby aiding the control of distortion. Furthermore, these nonferrous materials aid in eliminating the magnetic effects often set up in fixtures, which adversely affect the control of the arc. Use of these materials also prevents fusing the work to the fixtures and provides a convenient surface on which to strike the arc without "alloying" the tungsten electrode.

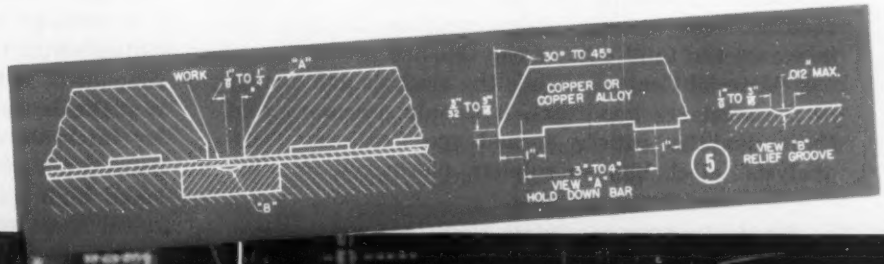
Fixture Requirements Important — Hasty analysis of the fixture requirements for the process may result in the false conception that the requirements are too stringent and expensive. However, more careful consideration will reveal that if all the basic fundamentals are fully appreciated by those working on the fixtures, very little more work will be required to produce a satisfactory fixture than that needed to produce one unsuitable for the process.

Several manufacturers have adopted the process for welding bumper guards after careful cost and quality studies. The operator inserts the two simple stampings that make up this part into a fixture. A toggle link closes the fixture which holds the stamp-

Fig. 3—Loading large stamping into a front fender welding fixture

Fig. 4—Fixture can be positioned for operator comfort. Making weld on front of fender

Fig. 5—Drawing showing important details for designing successful fixtures



ings face to face. The operator turns the fixture as welding progresses so that the weld is made in the downhand position. Present design in bumpers is something entirely different from the slightly curved strip of steel that used to protect our cars.

More massive fixtures are used for the fenders. For typical two-piece front fender, the operator loads the parts into the fixture which is then closed and swung to the horizontal position for making the weld on the top of the fender. The fixture can be positioned for ease in loading and also for operator comfort.

Another type of fixture is used to fabricate a slightly different style of front fender. Hydraulic pressure forces the upper portion of the fixture down onto the work piece with sufficient pressure to bring slightly inaccurate contours into proper alignment. The welding platform is built a few feet above the floor level to accommodate the fixture and also to make it easy to load the large stamping into the fixture. Two operators work simultaneously, one making the weld on the top of the fender, the other welding the joints on the front beneath the headlight and grille openings.

Control of Stampings—1. Tolerance of Joint Fit-up—The importance of joint fit-up must not be overlooked, since it affects not only the quality of the weld but also influences the speed of welding, finishing and final cost. As would be assumed, the best condition from all standpoints is a joint in which the sheet edges are in metal-to-metal contact. Perfect conditions are, of course, not always possible and serious handicaps are not suffered if the sheet edges are not separated by more than the thickness of the material being welded. It is possible, if necessary, for example, to weld a joint where the sheet edges are separated by 1/8-inch on 0.050-inch stock. However, such extreme spacing makes welding difficult and increases the total cost of the finished product.

2. Material Control—While the analysis and quality of the steel are important, it is only necessary that these qualities satisfy normal specifications. "Off-analysis" steel, high in sulphur, phosporus, or other objectionable elements, may cause welding difficulties. Extreme variations in material thickness, abnormal spring-back and abnormal hardness will cause welding difficulties because of their effect on holding required tolerances when clamped in the fixture.

3. Stamping Contours—Consistency in stamping contours is essential, since variations will affect joint fit-up and proper holding of the parts in the fixture. This type of welding can be done in all positions, but, as in other welding processes, the best and fastest work can be done downhand. Therefore, on contour work the fixture positions the work so that all welding will be done as close to downhand as possible. Where a choice is possible on weld location, careful consideration should be given to the advantages of downhand welding.

A die trim should be the final operation on stampings to be subsequently welded. If a die trim is not used, difficulties with joint fit-up can be expected, which will be more costly than the die trim.

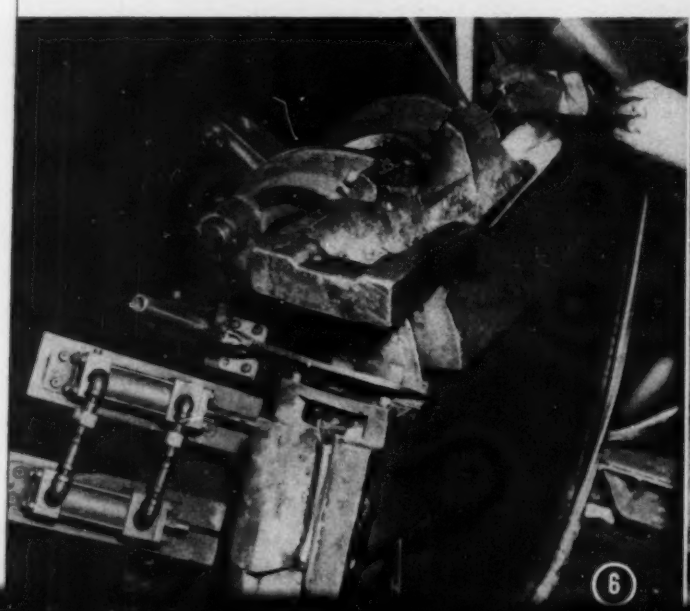
Filler Metal—Most of the welding on automotive work is done without the addition of filler metal in the interest of reducing cost. It sometimes becomes necessary to add filler metal when joint fit-up is poor. It is also necessary to add filler metal when going over a section already welded or when restarting a weld. In general, however, if the weld can be made without filler metal, it is advantageous to do so because higher speeds and lower final costs will result.

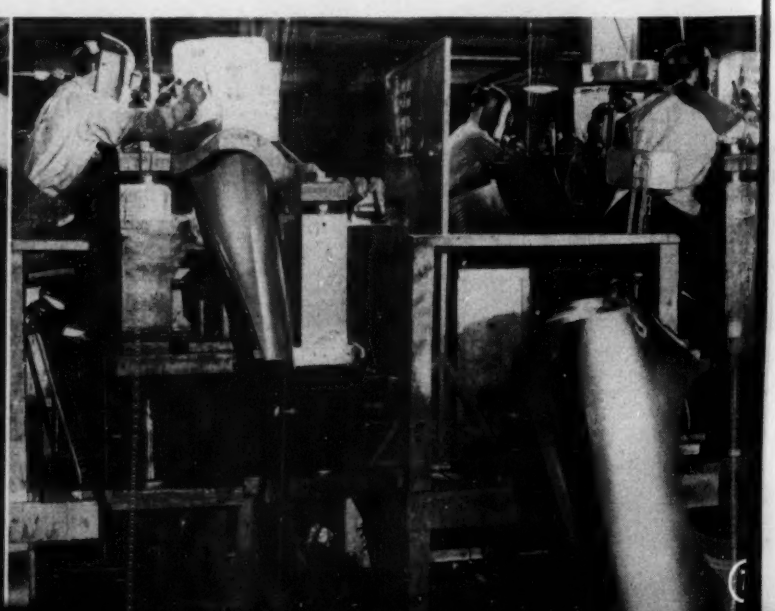
Frequently it is necessary to add filler metals because of poor joint fit-up and poor holding properties in the fixture. Addition of filler metal makes it possible to salvage parts which would otherwise be scrapped. In many cases, poor quality steel can be salvaged, if necessary, by the addition of filler metal. It is difficult to weld steel which has not been fully "killed" with the process unless filler metal is added. Amount of rod required to produce porous-free welds is slight, but a small quantity must be added at regular intervals or porosity will result. It should be pointed out here that, in general, it is not possible to make high quality welds with the process on hot-rolled sheet either with or without filler metal.

Function of filler metal in eliminating porosity is that of cleaning the weld (*Please turn to Page* 120)

Fig. 6—Rear fender fixture closed and welding in operation

Fig. 7—Details of hydraulic fixture for welding front fender





SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

REAL WORKING DRAWINGS: There are many industries in which working drawings actually are the patterns to which the material is cut without intervention of "hand operated" measuring instruments. This is true in the clothing industry, in some phases of woodworking, in sheet metal work and to some extent in shipbuilding.

Due to the close limits involved in most machine tool operations, direct translation of designs from drawing to work has not been common practice in machining. Inventors have dreamed about it, engineers have talked about it. Now little by little it is showing signs of becoming a reality. That is true particularly on tool work such as forming tools which in turn reproduce their forms in quantity in automatic screw machines.

The practical development of optical projection for gaging and inspection has paved the way for certain highly significant developments in direct translation of designs from drawing to work. Instead of projecting the work on an enlarged translucent drawing to see if it is right, the latest trend is to guide the tool—usually a grinding wheel—through a reducing pantograph mechanism from the enlarged translucent drawing to its cutting action on the work.

This in turn has inspired a new technique of "transparent line" drafting, as in the case of the layout scribing machine used in connection with Cincinnati Milling Machine Co.'s Projecto-Form optically guided form grinding machines.

By means of this scribing machine the draftsman, working with a carbide-tipped stylus on a glass plate coated with translucent emulsion, produces a 20 times full size "bright line" drawing whose lines are exactly 0.004-inch wide. When mounted in the control hood of the grinder, this bright line drawing, as a guide, insures work accurate to 0.004-inch divided by 20—or 0.0002-inch—when its projected image has been "ground down" to fall within the bright line.

It doesn't require great imagination to foresee the day when some kind of an "electric eye" will be hooked up with some such apparatus as this for even more direct and more automatic translation of shapes from drawing to work. This can happen in projection grinders and possibly in other varieties of machine tools—including turning and milling machines. Machine tool designers will do it if and when economic considerations warrant it, and that time may be closer than most of us realize.

HISTORIAN LOOKS AHEAD: Many leading industrialists are active members of the Newcomen Society for the study of the history of engineering and technology. The Latin motto on the coat-of-arms of the society—very freely translated—carries this thought: "To check up on where you are going, look over your shoulder now and then to see where you came from."

This modern conception of history as a dynamic—rather than a static—study, was made interesting and understandable to 300 people who listened to Dr. Cornelis W. de Kiewiet, acting president of Cornell University, at the 1949 annual dinner of the National Machine Tool Builders' Association at White Sulphur Springs, W. Va. Born in Holland, reared in South Africa and educated in South Africa, London, Paris and Berlin, Dr. de Kiewiet is one of the foremost dynamic historians. Looking over his shoulder at England, here are some conclusions he draws.

"Failure of British industry to modernize plant and equipment fast enough to keep pace with public demand for social progress, paved the way for state socialism in England. British industrialists took their profits out in social distinction, instead of plowing them back into their businesses for the purchase of modern production equipment that would lower costs, increase markets and raise industrial efficiency and the standard of living.

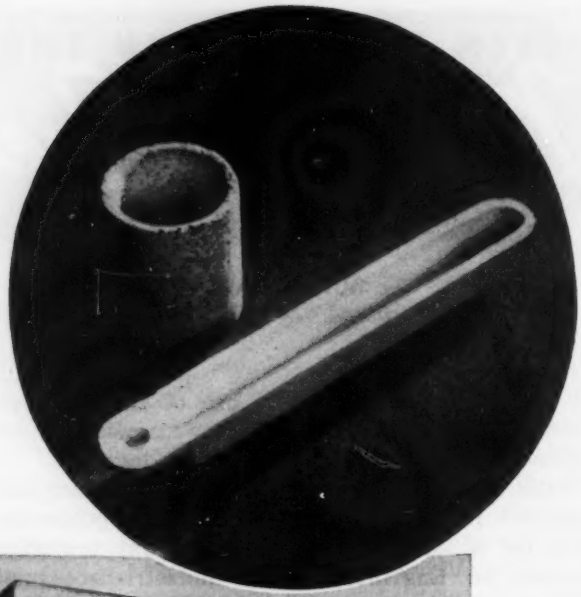
"The world needs more tools, more experts, more know-how. Progress in the modern world demands removal of ignorance, under-equipment and want. Mechanization is an indispensable factor in solving many of the world's ills. This means that a prosperous and aggressive American industrial order is as necessary as a sound American foreign policy. American security and leadership are bound up with a form of government that guarantees incentives for modernization and profits for enterprise, since profits through reinvestment are the life blood of industry.

"Historically, active individual creative effort is necessary to provide society the full benefits of research and invention. Such creative effort is stifled under a regimented economy—which reaches finally the inevitable result of stagnation of productivity and self-perpetuation of bureaucracy.

"Social progress is after all a reflection of work performed. Machines multiply man's capacity to turn out work, but also involved is man's willingness to work. Willingness depends upon potential awards—and awards can be offered only in a free society. If we expect in this or in any other country to gain the benefits of technological advances, we must preserve the human willingness and desire to put those advances into practical application."

"PUTTING-ON" TOOLS: Many shop jokes of yesterday are shop realities today. One is the "putting-on" tool. Shopmen over 50 will recall that most apprentices were sent to the tool crib in hopeful quest of that once mythical instrument for bringing back to size parts which they had turned too small.

While not available to correct mistakes of careless apprentices, there are today several practical tools for "building up" metal parts by plating, spraying or welding. It is significant that they are graduating from replacement of worn surfaces to placement of wear-resisting surfaces.



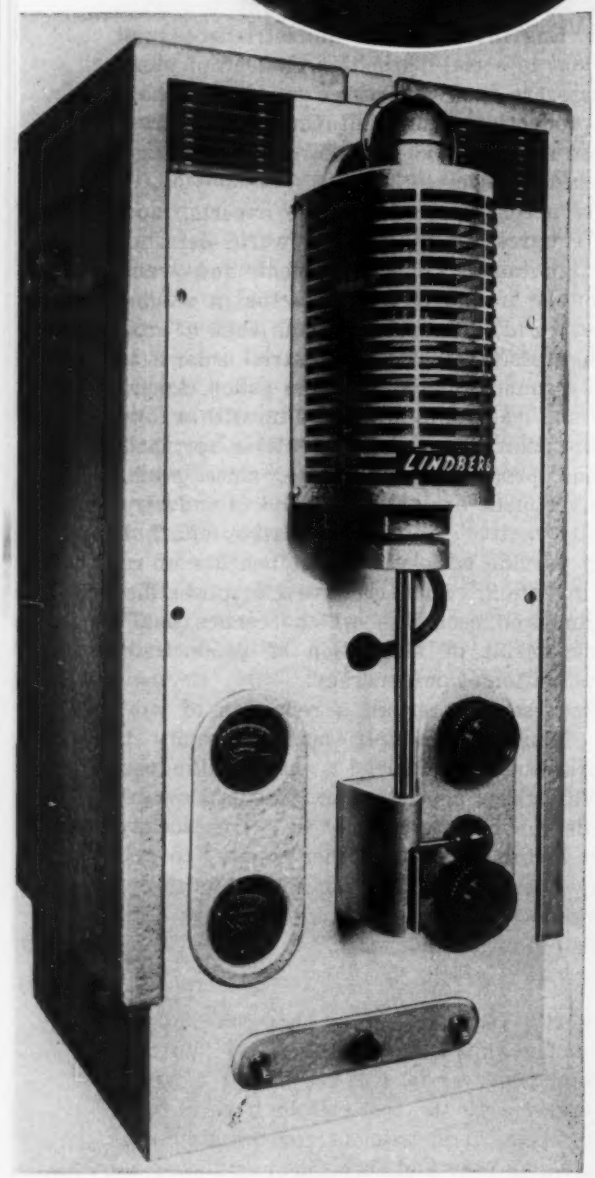


Fig. 1 (top)—High refractory "cupelet" and conventional boat

Fig. 2 (bottom)—High frequency furnace used in making carbon and sulphur analyses

STEEL ANALYSIS

Operating at temperatures exceeding 3000° F, high frequency induction heating is used successfully in carbon and sulphur analysis, reducing carbon determination time from 10 to 2½ minutes

BY W. K. AITES*

CARBON and sulphur analysis of iron and steel by direct combustion is by far the most prevalent method in use today. In the application of heat, the resistance element furnace has, until now, been the only feasible means. Modern furnaces may be operated continuously at 2500° F, but there is some doubt as to whether these temperatures are sufficient when extreme accuracy is required. This would specifically apply to the analysis of high alloy steels and refractory metals.

A new method of producing high temperatures, applicable to carbon and sulphur determinations, is radio frequency induction heating. The writer has had an opportunity to operate new equipment based

* The author is assistant chief chemist of a large Western Pennsylvania manufacturer of railroad equipment.

TABLE I
RESULTS OBTAINED IN CARBON DETERMINATIONS

	*Previous Analysis			By R-F Combustion			
Type of Sample	System Used	% Total Carbon Range by Reporting Laboratories	% C Average	Determinations	Total Carbon Range		% C Average
B. of S.—5i	A	2.49 2.56	2.52	10	2.515	2.54	2.529
.....—5i	C	2.49 2.56	2.52	10	2.495	2.53	2.518
B. of S.—6e	C	2.57 2.66	2.61	10	2.595	2.615	2.604
B. of S.—7e	A		2.93	10	2.925	2.94	2.931
.....—7e	B		2.93	10	2.920	2.935	2.928
.....—7e	C		2.93	10	2.915	2.930	2.925
.....—7e	D		2.93	10	2.920	2.935	2.926
Cast Iron From Our Foundry	C		2.89	10	2.880	2.920	2.895
Gray Iron From Our Foundry	C		3.29	10	3.27	3.31	3.289
Gray Iron From Our Foundry	E		3.29	10	3.30	3.35	3.324
Gray Iron From Our Foundry	C		3.098	10	3.08	3.10	3.09
Gray Iron From Our Foundry	E		3.098	10	3.10	3.12	3.11
B. of S. Ingot Iron	No Tin	2.7272 gms	.012	5	.011	.014	.012
B. of S. Ingot Iron	No Tin	1.3636 gms	.012	5	.010	.012	.011
B. of S. 101A	C	1.3636 gms	.049	5	.046	.050	.048
B. of S. 72D	C	1.3636 gms	.31	5	.298	.312	.305

* As given in Bureau of Standard certificates or previously found by our own laboratory using resistant element furnace at 2300° F

TABLE II
RESULTS OBTAINED IN SULPHUR DETERMINATIONS

		—Previous Analysis—		—By R-F Combustion—		
Type of Sample	Accelerator	% S Range	% S Average	Determinations	% S Range	% S Average
B. of S. 5i	Cu Strip	.099-.105	.103	5	.097-.105	.1008
.5 gm	Sn	.099-.105	.103	5	.098-.105	.1018
.5 gm	Sn Fe	.099-.105	.103	5	.098-.104	.1020
Pin Sample From Foundry Mix	Sn	By Evolution	.126	5	.127-.132	.1308

...TIME CUT

. . . by radio frequency heating

on this principle during the final stages of its development and results obtained have been highly satisfactory. Various advantages, specifically the ability to operate at temperatures exceeding 3000° F are claimed by the manufacturer, and are presented in this article.

Basic Concept—The basic concept of this method is the inductive heating of the sample to temperatures previously impracticable with resistance element furnaces. This principle has previously been applied to many other heating applications in industry. It has the important advantage of generating heat only in the metal sample. In a matter of 2 or 3 seconds the sample is melted and the adjacent parts such as crucible, tube, etc., are heated only by radiation or conduction from the relatively small mass of the charge.

The apparatus comprises a short vertical glass combustion tube surrounded by an air-cooled coil to which radio frequency energy is supplied by a vacuum tube oscillator. The conventional boat is replaced by a high refractory "cupelet" developed specifically to withstand the thermal shock produced during the combustion cycle. Oxygen is introduced through integral piping wherein the use of rubber tubing has been eliminated and flow is regulated by control valves situated on the front panel.

Atmosphere seals are provided by aluminum breech connectors in conjunction with synthetic rubber "O" rings, which are completely outside the heated zone. The loading and sealing operation is accomplished by a vertical bolt-action mechanism. Relative position of the coil and crucible is established by an adjustable pedestal supporting a ceramic hearth.

Simple Operation—Operation is relatively simple. To place the equipment in operation requires the manipulation of one toggle switch which controls the power input to the device. This lights up the vacuum tubes and actuates an automatic time delay unit. At the end of the 1 minute delay period, a second toggle switch may be thrown after the loaded crucible is placed in the firing position. This switch energizes the coil, the metal is fused and products of combustion are released.

The manufacturer has informed us that the unit was specifically designed for granular samples, or for borings and turnings normally employed in carbon and sulphur determinations. In our laboratory, however, solid samples have been successfully fused, and very satisfactory determinations have been performed on total carbon of cast irons.

Carbon Determinations — The following systems were used in an attempt to establish the most efficient procedure for employing this apparatus in the determination of carbon:

A.	0.5 gm Ingot Fe	+ 0.5 gm Sn	+ 0.5 gm drillings
B.	0.5 gm Ingot Fe		+ 0.5 gm drillings
C.		0.5 gm Sn	+ 0.5 gm drillings
D.		0.5 gm Sn	+ 1.0 gm drillings
E.		0.5 gm Sn	+ Sample in form of solid pieces weighing from 0.58 to 0.88 gms

All methods employed gave excellent fusion. From Table I it will be noted that all results were well within the range given in Bureau of Standards certificates.

With oxygen flow in the range of 600-700 ml/min., complete fusion was obtained within 40-60 seconds from time of ignition. Tests with barium hydroxide established that 100 per cent of the CO_2 evolved was absorbed after an additional 1½ minute flushing period, giving a total time interval of 2½ minutes. The new process is four to five times faster than the old.

Method employed in system E (Table I) should be of particular interest in the analysis of total carbon for ordinary cast irons and specifically nodular cast irons. The sample was obtained by casting a ¼-inch diameter pin and cutting from it a ½ gram to 1 gram slug, thereby eliminating drilling or crushing and consequent loss of graphitic carbon.

The general procedure presently followed of using tin only as an accelerator proved to be satisfactory. The addition of ingot iron was not necessary to obtain complete fusion.

Sulphur Determination—The same systems as those employed with carbons were applied to sulphur determinations. In addition, copper strip was used instead of tin, and a bedding of chromic oxide proved effective in reducing the formation of iron oxides to a marked degree. Table II gives the results obtained.

An oxygen flow of 1000-1200 ml/min. seemed to be required in order to obtain consistent results for sulphur determinations. It should be noted that with a greater rate of flow, a drier oxygen supply than ordinarily used in carbon determinations is necessary to reduce the amount of oxide fog. Average time required for the complete induction period was 4 minutes.

Conclusions—No volumetric carbon determinations were conducted in this laboratory. It would seem reasonable to suppose that the very short combustion tube would be of material advantage as a more complete sweep of combustion products is assured. Reports from other laboratories have substantiated this conclusion.

Time for carbon analysis was reduced from 10 minutes to 2½ minutes. Additionally, the introduction and removal time of the sample is materially decreased.

To laboratories where carbon and sulphur analyses are performed on an intermittent basis, the unit offers additional advantages because radio frequency heating is always available with only 1 minute preheat time required. Therefore, the unit is ready for immediate operation as desired. The stand-by power consumption is only 125 w and the full-load power requirement is approximately 1000 w; the latter demand exists only when fusing the sample. These figures compare to the 2500-4000 w per hour required to maintain our present resistance element furnace ready for determinations. (*Please turn to Page* 112)

Acknowledgement is made to the engineering staff of Lindberg Engineering Co., Chicago, for providing the laboratory size high frequency unit used to make the above determinations.

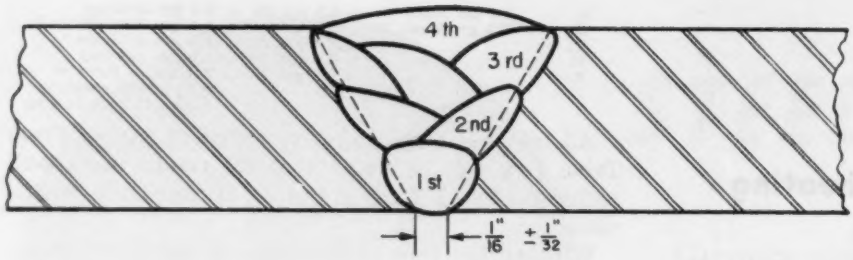


Fig. 1—Sketch showing method of depositing weld metal

CHROME PIPE WELDING

. . . improved by new methods and rigid shop procedure

By C. G. HERBRUCK
Lincoln Electric Co.
Cleveland

PROCEDURES which resist the natural tendency of 4 per cent and 6 per cent chrome pipe to air-harden during the continuous welding process are meeting with excellent success at Houston Pipe & Steel Inc., Houston, Texas, during the processing of pipe for steam and sour crude oil usage. Recent tests of A158-46T chrome pipe welded disclose a total load of 25,900 pounds, unit strength of 71,200 psi, with satisfactory root bend, side, free, torsion and face bends, meeting ASME code requirements.

Preference for 4-6 chrome pipe, particularly for steam and sour crude oil processing, stems from its resistance to oxidation and corrosion, coupled with its tensile strength and resistance to heat.

Rigid Specifications—Rigid welding specifications developed by this fabricator as standard shop procedure call for shielded arc welding exclusively for 4-6 chrome piping. The first prerequisite is that the base metal conform to specifications for ASME-SA-158 P5 or ASTM A-159-46T type P-5a or equal. Filler metal must conform to ASME specification P5 for materials for procedure and operator qualifications, table Q5. The company is currently obtaining excellent results with Lincoln Electric Co.'s 4-6 Chromeweld electrode.

Welding is done in the following positions: (a) Flat; (b) horizontal rolled (pipe); (c) horizontal fixed (pipe); and (d) vertical (pipe).

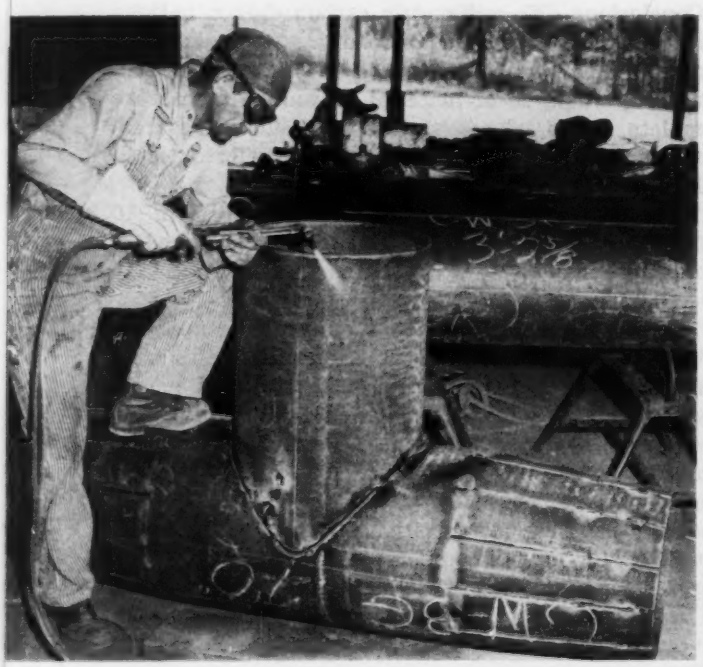
Edges or surfaces of the parts to be joined by welding are prepared by flux injection gas cutting, abrasive disk or machine cutting and are thoroughly cleaned of all oil, grease and oxides. Direct current is used electrode positive, work negative, with material on the negative side.

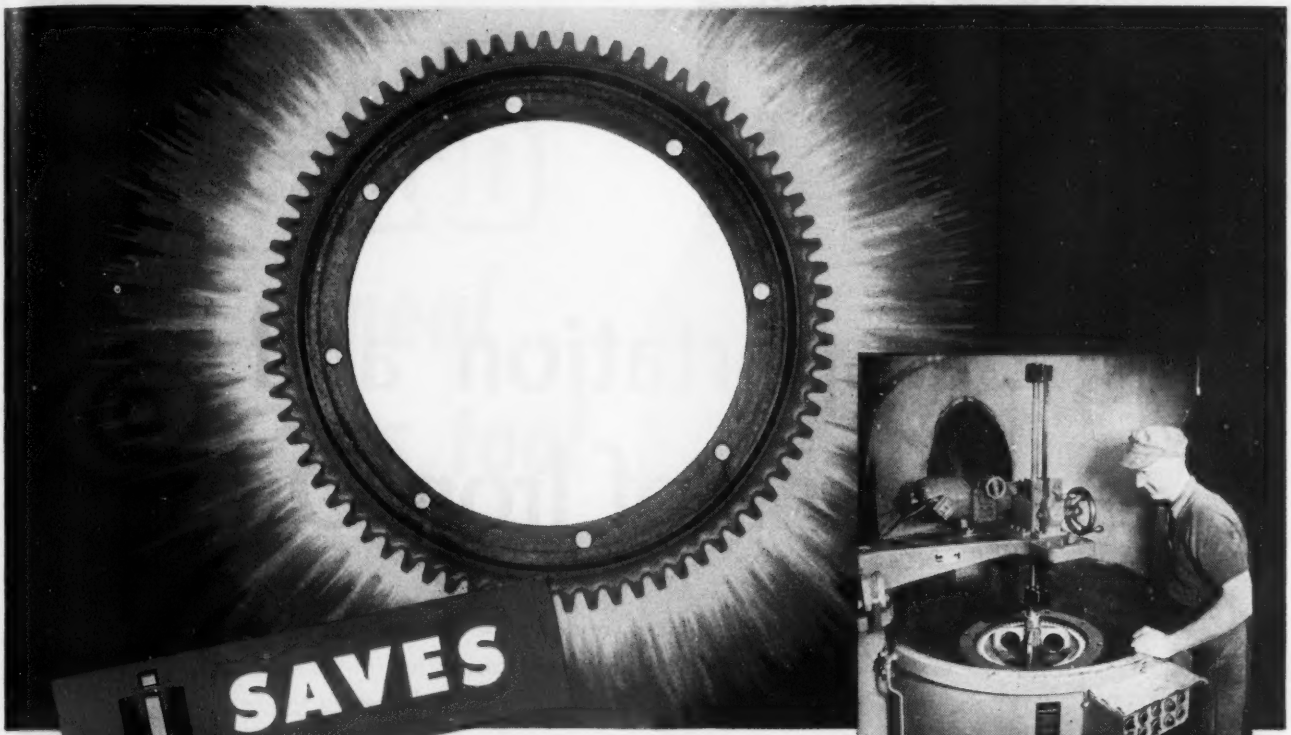
Welding Technique—The welding technique, electrode sizes and mean voltages and currents for each electrode are as follows:

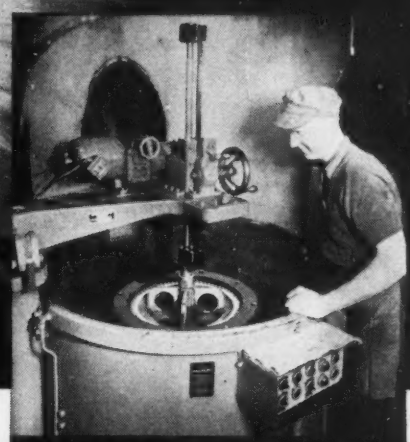
(*Please turn to Page* 112)

Fig. 2 (left)—Fabricator's station, where pipe is segregated according to sketch. Various pieces are fitted together by means of tack welds, using Lincoln Electric 4-6 Chromeweld electrodes. Welder is shown beveling a branch on a shop-made tee

Fig. 3 (below)—Heat treatment calls for preheating to 600-800° F and maintaining this heat until welding is completed. Completed weld is heated to 1200-1350° F. Pipe is then wrapped with asbestos at least 1 inch thick and allowed to cool to room temperature







This TOCCO gear machine is powered by a 150 K.W., 10,000 cycle motor-generator set. Photo—courtesy of International Harvester Company.

$82,507 Per Year with TOCCO* Induction Hardening

GEARS, shafts, pins, wheels, tubes and bars—almost any size or shape of part—or any metal, too—is adaptable to TOCCO hardening, brazing, annealing or heating for forging.

PRODUCTION UP—Engineers at the Milwaukee Works of International Harvester Company have adopted TOCCO for hardening final drive gears for famous International Harvester farm tractors. TOCCO increases production on the gear shown here from 14 to 35 per hour, 250% faster than conventional heating method, reduces job from a 3 shift to 2 shift operation, even with increased production schedule. Heating time is 35 seconds; oil quench, 60 seconds.

COSTS DOWN—TOCCO cuts cost—saves $82,507 per year on application shown above. TOCCO makes possible use of C-1050 A.R.R. steel instead of expensive A-8645-H alloy steel previously required. TOCCO also eliminates shot-blast, formerly needed to remove scale, and extra machining operations that used to be necessary to compensate for distortion.

Gear shown is 18½" O.D., width of face is 2", weight 34 pounds, 73 teeth. Hardness obtained is 55-66 R.C., using 140 K.W. of 10,000 cycle power.

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FUNDAMENTALS OF STEELMAKING

NUMBER **17** OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

By P. L. TIETJEN
President
Interstate Steamship Co.
Pittsburgh

Transportation and Handling of Iron Ore

First shipment of ore in any quantity sent down the Great Lakes from the Lake Superior district consisted of 152 tons transported in September 1853. During 1948 almost 83 million gross tons were delivered to lower lake ports. Today's tonnage passing through the Soo during the eight month shipping season is greater than that handled through the Suez and Panama Canals combined for the entire year

PART I

MODERN handling of iron ore from the mines of the Upper Lakes region to the unloading docks presents a far different picture from that of early days.

The history of bulk transportation on the lakes is comparatively short. Each period of the development to present enormous handling capacity has seen three factors go hand in hand. With the ever increasing demand for more iron ore to keep blast furnaces glowing has come increased size of ships, faster loading and unloading equipment and improvement of the harbors and waterways, which make up the greatest system of inland waterways and the most economical transportation to be found anywhere on earth.

Fig. 1—Typical summertime scene in the St. Clair river above Detroit. None of the ships shown in this view checked its speed while passing

The federal government has spent vast sums to increase the locking facilities at Sault Ste. Marie and to provide deeper and better waterways. On no system of water transportation in the world is the stream of long ships steadier. Over the 1000 miles from Duluth at the western end of Lake Superior to Buffalo on the eastern end of Lake Erie, there is scarcely a time during the navigation season when ships are not in sight of one another.

Tonnages moved on the Great Lakes are unbelievable, exceeding in one season the combined shipping of the Atlantic, Gulf and Pacific coasts.

Forming a connecting link between the ore mines of Michigan, Minnesota and Ontario and the steel mills of Cleveland, Youngstown, Pittsburgh, Buffalo and Chicago are the Great Lakes, consisting of Lake Superior, joined to Lake Huron by the St. Mary's river, from Lake Huron to the west and through the Straits of Mackinaw to Lake Michigan and the Chicago area, to the southeast across Lake Huron down the St. Clair and Detroit rivers to Lake Erie ports.

The first shipment of ore in any quantity from the Lake Superior district consisted of 152 tons which was sent to Sharon, Pa., in September, 1853.

It took four vessels to move the ore from Marquette, Mich., on Lake Superior, to Sault Ste. Marie, where it was portaged over the falls to be reloaded to another vessel. It was delivered at Erie, Pa., and sent by canal to Sharon.

Vessels on Lake Superior at that time consisted of three or four schooners, ranging from 15 to 20 tons,

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To anneal welded railroad tank car bodies and other products, a wide heat range, with extreme flexibility to meet complicated heat treating problems, was an important requirement in this large furnace designed and built by **JET COMBUSTION, INC.** for General American Transportation Corporation.

B&W IFB — which have the lightest weight, lowest heat loss, and the lowest heat storage of all insulating firebrick — were selected for the furnace lining.

These qualities of B&W Insulating Firebrick assure quick temperature control and rapid response to changes in heat input. Then, too, their extra light weight saves on furnace construction costs, simplifies furnace design.

Whether your furnace is large or small, you will benefit by using economical B&W Refractories. Why not talk it over with your local B&W Refractories Engineer. Just telephone or drop him a postcard today.

FURNACE SPECIFICATIONS

Inside length	52′
Inside width	19′
Car top to arch	21′
Arch Span	21′

Walls of B&W K-23 IFB
Arch of B&W K-26 IFB

R-359

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and a couple of small steamers, all of which had been hauled over the portage at Sault Ste. Marie. Meanwhile, Congress had authorized a grant of land and a company known as the St. Mary's Falls Ship Canal Co. was organized to build a canal around the rapids at Sault Ste. Marie and had begun construction work in 1852.

For the next two or three years wheelbarrows and horse carts unloaded and carried every pound of ore over the portage at the Sault. Today the tonnage passing through the Sault in the eight month season is more than is handled through the Suez and Panama Canals combined for the entire year.

The canal at the Sault was opened to commerce on June 18, 1855. The brig *Columbia* carried the first cargo of 132 tons of ore from Marquette through the canal in August of the same year. In all, 1447 tons were shipped through the canal that year. Dimensions of the locks were 350 feet long by 70 feet wide with 11½ feet over the sill. There were two locks in tandem, each having a lift of 9 feet. This of course regulated the draft of vessels in Lake Superior service.

Fig. 2—Navigating a narrow channel in the Cuyahoga river at Cleveland

In these early days one of the big obstacles was transporting the ore from the range to the docks. First sleighs were used in the winter time, as there were no passable roads in the spring and summer. Then a strap railway was built which used mules and the movement of 35 tons from the mines to the lake was a big day's work. In 1857 a steam railroad began operations. The little dock at Marquette was a flat structure without a trestle and vessels were loaded by means of wheelbarrows.

Practically all shipments during the first few years were carried by schooners. All steamers in these early days carried passengers and were not fitted to carry iron ore, though they would occasionally carry a deckload but avoided it if they could. Such a thing as a bulk freighter had not at that time been thought of. In 1860 the ore trade reached 114,401 tons, but fell to 50,000 in 1861, the decrease being caused by the outbreak of the Civil War. Grain was then the leading commodity transported. In 1866 grain shipments to the port of Buffalo alone were about 1,500,000 tons, and lumber shipments to Chicago were about 1,400,000 tons, whereas ore tonnage to Lake Erie amounted to only 278,000 tons.

About 1862 some of the ore companies began to show profit. They joined together and built a wooden

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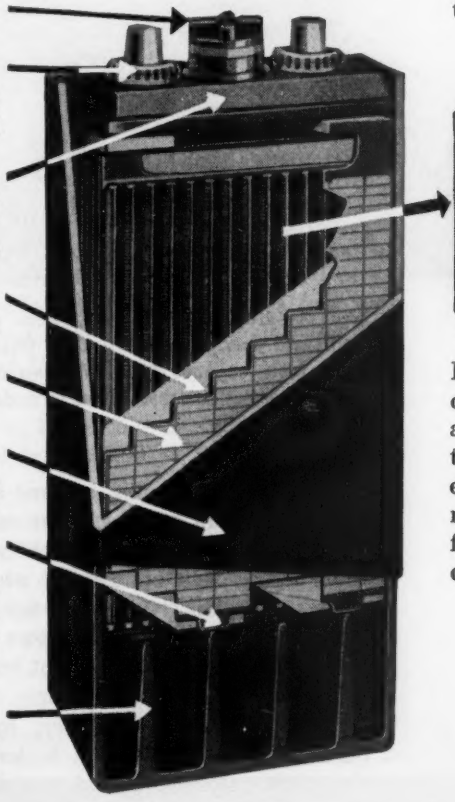
Storage batteries are called upon to perform many tasks. No single type of battery is adequately suited to all. To meet these numerous requirements, Exide engineers have developed special types, to fit each application.* Among these several types is the specially designed Exide-Ironclad Battery. Details shown below.


VENT PLUG specially designed to prevent escape of electrolyte.
GREASE SEAL RING NUT holds battery elements securely in place . . . prevents creepage of electrolyte . . . keeps tops clean and dry.
SEALED CELL COVER flush with top of jar. Prevents collection of dirt or moisture . . . keeps impurities out of cell . . . eliminates leakage of electrolyte.
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NEGATIVE PLATE made extra heavy and built to match the long life of the positive plate.
JAR made of specially tough and durable Giant Compound. Built to withstand the jolts and jars of hard industrial usage.
FEET. Internal short circuits practically eliminated because the two feet on negative plate rest on different ribs from those of the positive plate, and because separators extend below both plates and rest on all four ribs.
RIBS support all plates and separators. Their height provides generous sediment space so that internal cleaning is unnecessary.

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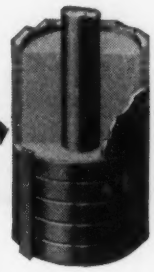

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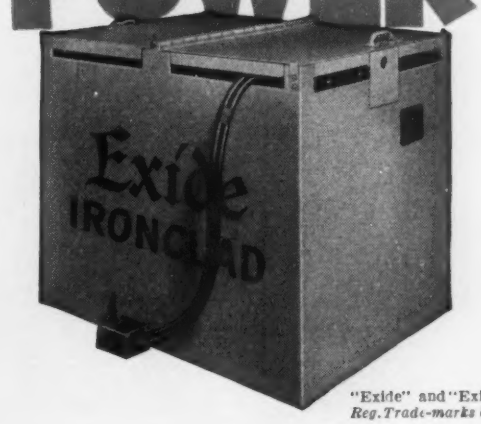
Consists of a series of finely-slotted tubes which contain the active material. So small are these slots that, while permitting easy access of electrolyte, they retard the active material from readily washing out or jarring loose . . . adding considerably to life of plate.

Exide-Ironclad Batteries have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from battery electric industrial trucks — high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these four Exide-Ironclad characteristics assures years of dependable day-in, day-out service.

DEPENDABLE POWER



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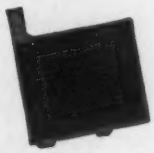

1888...DEPENDABLE BATTERIES FOR 61 YEARS...1949

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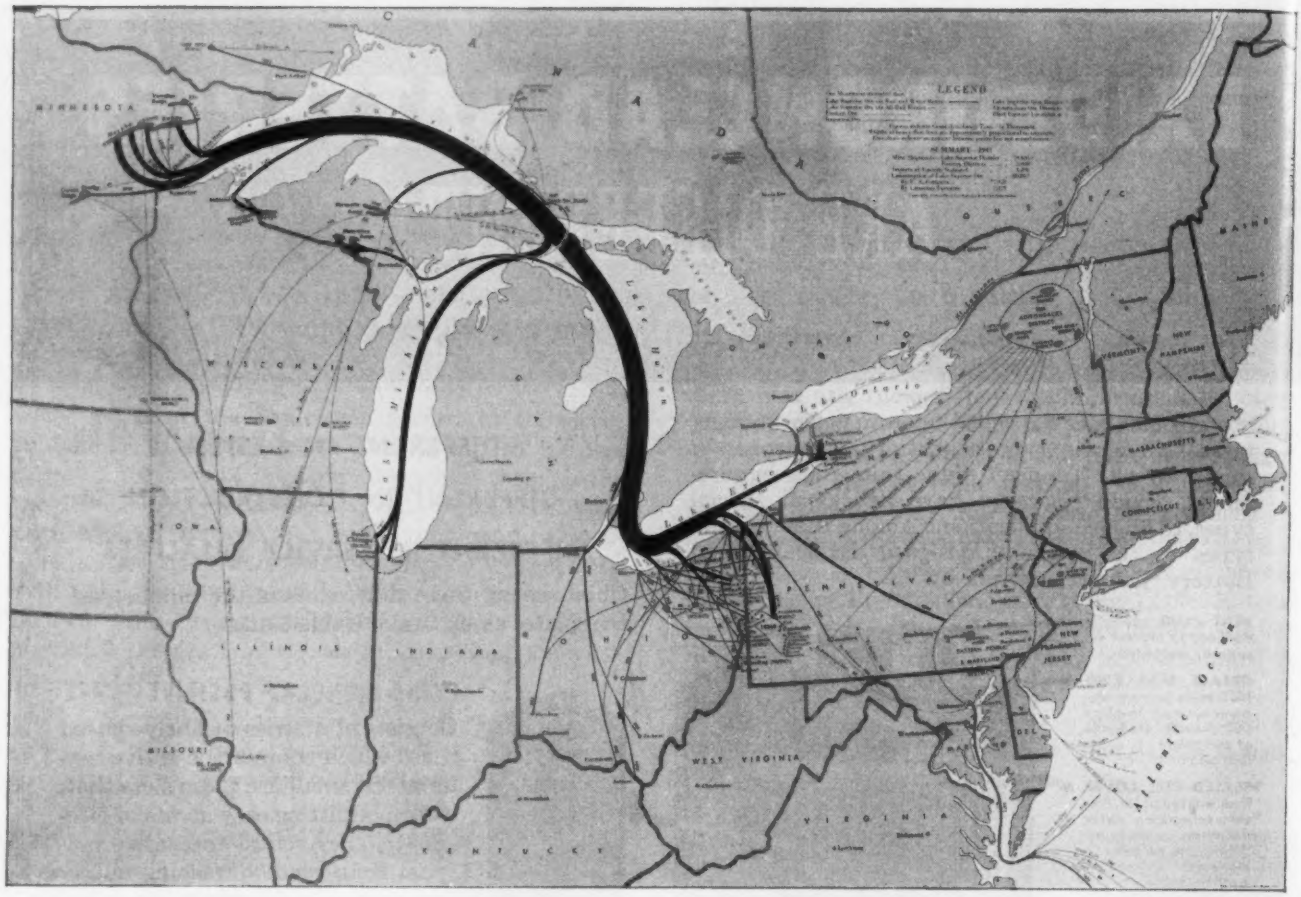


Fig. 3—Map showing movement of Lake Superior iron ore and of eastern and imported ore during 1947 from sources to consuming districts. Courtesy Lake Superior Iron Ore Association

Handling of Iron Ore

dock with trestle and pockets to facilitate ore loading. This was the forerunner of the present great docks which load through a spout from a bin, or pocket as commonly known. The schooners of the early days had hatches on the deck so they could load directly under the pockets, but the steamers had side gangways through which they loaded in wheelbarrows.

Fig. 4—Before the turn of the century these whalebacks or "pig boats" were seen on the Great Lakes. View shows steamer at right and barges which it towed lie to the left

The process of loading became simple, but unloading was another matter. The average cargo was about 300 tons which took nearly four days to unload. Staging was built upon which the cargo was shoveled and then reshoveled up to the deck where it was loaded into wheelbarrows and wheeled onto the deck. The next improvement was block and tackle, using a horse and a tub. Some docks employed 40 horses in unloading a schooner. In 1867 at Cleveland a portable steam hoist with boiler was designed and built which unloaded a boat in a single working day. This method was very successful and continued to be used for the next 15 years.

Channels in these days had no aids to navigation, so night movement was impossible.

In 1869 the steamer *R. J. Hackett* was built to carry ore primarily, and she was—as the term is now understood—the first bulk freighter to be built on the lakes. She was 211 feet long and 33 feet beam, with engines aft. In 1870 the *Forest City* was built as her consort. This system grew popular and it was the prevailing practice for twenty years to use steamers and tow barges.

In 1874 the steamer *V. H. Ketchum* was built and was regarded as larger than anything afloat, being 233 feet long, 41 feet beam and 24 feet deep.

As stated before, vessel draft was limited by the

The author graduated from the University of Michigan in 1934 receiving a Bachelor of Science degree in naval architecture and marine engineering. He began work with the Toledo Shipbuilding Co. immediately after graduation and in 1935 and 1936 served with the Bureau of Marine Inspection and Navigation, Department of Commerce. From 1936 to 1941 Mr. Tietjen was employed by Pittsburgh Steamship Co. in Cleveland. In 1941 he became associated with Interstate Steamship Co. as marine superintendent, the following year becoming marine manager. Three years later he also became manager of the Union dock at Ashtabula, O. where the steamship offices were moved and consolidated with the dock offices. He was elected president of Interstate Steamship Co. in 1948 and was also appointed director of water transportation for the parent company, Jones & Laughlin Steel Corp., which title he now holds in addition to having been named president of the Union Dock Co. earlier this year.

locks at the Sault. However, by 1870 many ports had a depth of water of 13 feet and over, so that the demand soon became general to have a depth of 16 feet throughout the lake system. In 1881 a new lock 515 feet long, 80 feet wide and 16 feet over the sills with a single lift of 18 feet, was built.

Iron ore shipments increased from 278,000 tons in 1866 to 2,500,000 in 1884. The freight rate per ton on iron ore ranged from $3.00 to $6.00 in 1866 and fell to $1.35 in 1884.

In 1882 the steamer *Onoko* was built and was 287 feet long and had a 38 foot beam; at the time she was the largest carrier on the lakes. In 1886 the first steel bulk freighter was built on the lakes and named the *Spokane*.

Fig. 5—View of the first 10,000-ton ship on the Great Lakes being unloaded at Erie dock

Fig. 6—These old time whalebacks were used as ice breakers. The bow would be run up on the ice and then the ship's weight would break through and clear the channel. Old time Hulett unloader is seen in background

Not until 1888 did iron ore become the leading commodity on the lakes. During that year over 5 million tons were moved. Tonnage carried by the vessels at this time on a 16-foot channel varied from 2000 to 3800 tons.

In 1889 Alexander McDougall of Duluth built a new type of vessel known as the whaleback or pig. Within three years about 30 of this type were built, but shortly their disadvantages outmoded them.

It was soon necessary to have deeper channels, so a draft of 20 feet was proposed. In 1896 the new Poe lock was opened. In 1895 the first 400 footer appeared which was known as the *Victory*. She was 400 feet overall, 380 feet keel length, 48 feet beam and 28 feet deep, carrying 5200 gross tons of iron ore on 18 feet draft.

These bulk freighters had no need of a main deck for bulk cargoes, therefore no deck plating was laid on the main deck beams in the cargo holds. The bottoms were very flat and full so as to carry maximum cargo. Due to shallow rocky channels, double bottoms were required and this space, about five feet deep, was available for water ballast when running

light. The top of this tank, which is the bottom of the cargo hold, is called the tank top. In order that the hold may be absolutely free of cargo the machinery is placed as far aft as possible. As the spouts of the ore loading docks are uniformly spaced with 12-foot centers, hatches are either 12-foot or 24-foot centers on the vessels. With limited draft and operating in relatively shallow water, and the fact that ore is very heavy, the vessels are very full, with flat bottoms and full ends, resembling large long boxes, to give maximum buoyancy.

In 1900 the first of the so-called 500 footers appeared on the lakes. In that year A. B. Wolvin built four steamers which are still operating, the *J. J. Hill, John W. Gates, Isaac L. Ellwood,* and the *William Edenborn.* These vessels had a 52-foot beam, were 30 feet deep and powered with quadruple expansion engines.

In 1904, Mr. Wolvin built the largest steamer on the lakes, *Augustus B. Wolvin,* 560 feet overall, 540 feet keel, 56 feet beam, and 32 feet deep, with 33 hatches spaced 12-foot centers. All of the vessels built up to this time had stanchions and main deck beams in the hold cluttering up the cargo space. This vessel was the first to be built with the plate girder arch construction. The tank top was bent and plated up to the main deck stringer making what we now call the side tank or side hopper. Of course this increased water ballast capacity of the ship and also brought the ore closer so that it was within the reach of the unloading machines. This unobstructed cargo hold allowed free movement of unloading machines thus permitting better ore loading.

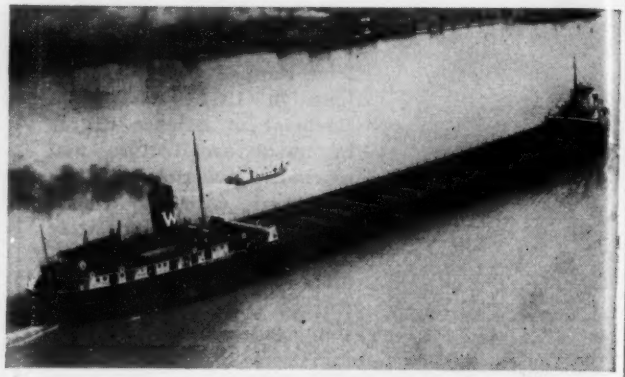
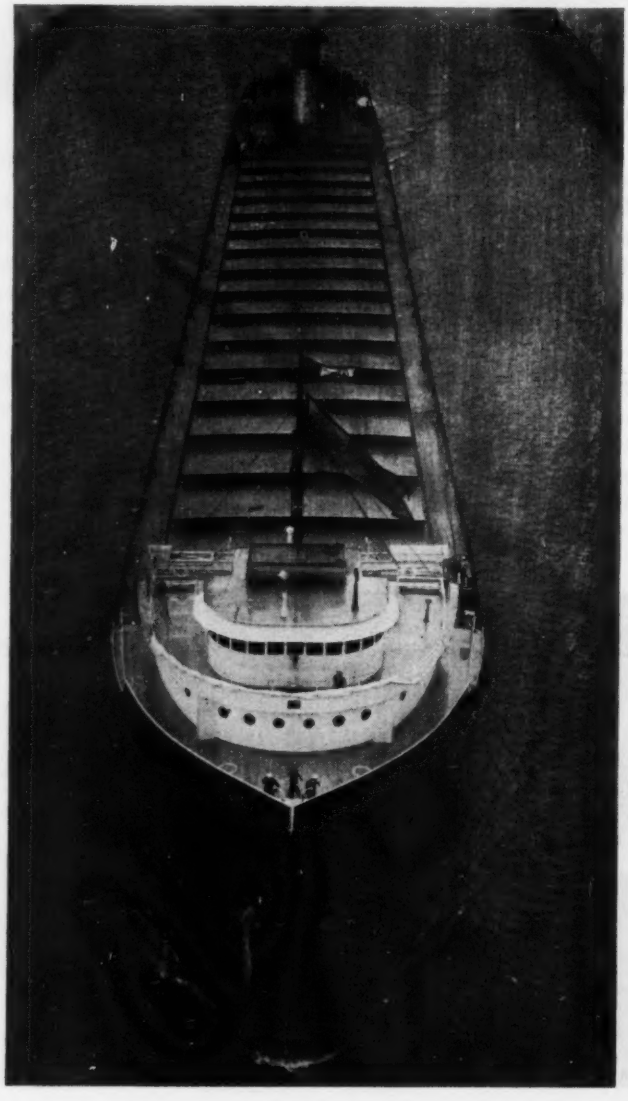


Fig. 7—"Iron deckhand" seen between last two hatches eliminates much of the manual labor during loading and unloading and necessity of applying tarpaulins to keep hatches watertight during the long lake hauls

Fig. 8—One of five recently built ore carriers which are commonly referred to as the "super dupers". They can haul 18,600 *long tons of ore per trip at 24-foot draft*



In 1906 the Pittsburgh Steamship Co. ordered eight ships 600 feet overall with a beam of 58 feet. These were the first of the so-called 600-footers. From 1904 through 1917 two hundred and nine of these vessels were built.

Operating expenses of these large new vessels were little more than the old ships with about the same crew being carried. Engines remained practically unchanged except for slight increases in horsepower; however, these vessels are relatively low powered. The standard power layout was single screw consisting of a triple expansion engine of about 1800 to 2000 indicated horsepower with steam pressures of around 175 pounds furnished by 2 or 3 coal-fired scotch marine-type fire tube boilers. Speed of these vessels is about 11 to 12 mph. The skill with which these ships are maneuvered in narrow channels and tight places around loading and unloading docks is amazing.

During the period from 1910 until 1929 many lake vessels were constructed with an almost standard size of 600 feet in length, 58 or 60 feet beam and 32 feet deep, with capacities ranging between 12,000 and 13,000 tons, with a few exceptions.

Cargo holds of these vessels are about 420 to 430 feet in length, divided by bulkheads into three or four compartments transversely. As stated before, there is an inner bottom and also side tanks. The side tanks are conveniently built in a hopper form to ease the unloading and of course give additional water ballast space when running light. During this period hatch covers were of the telescoping type,

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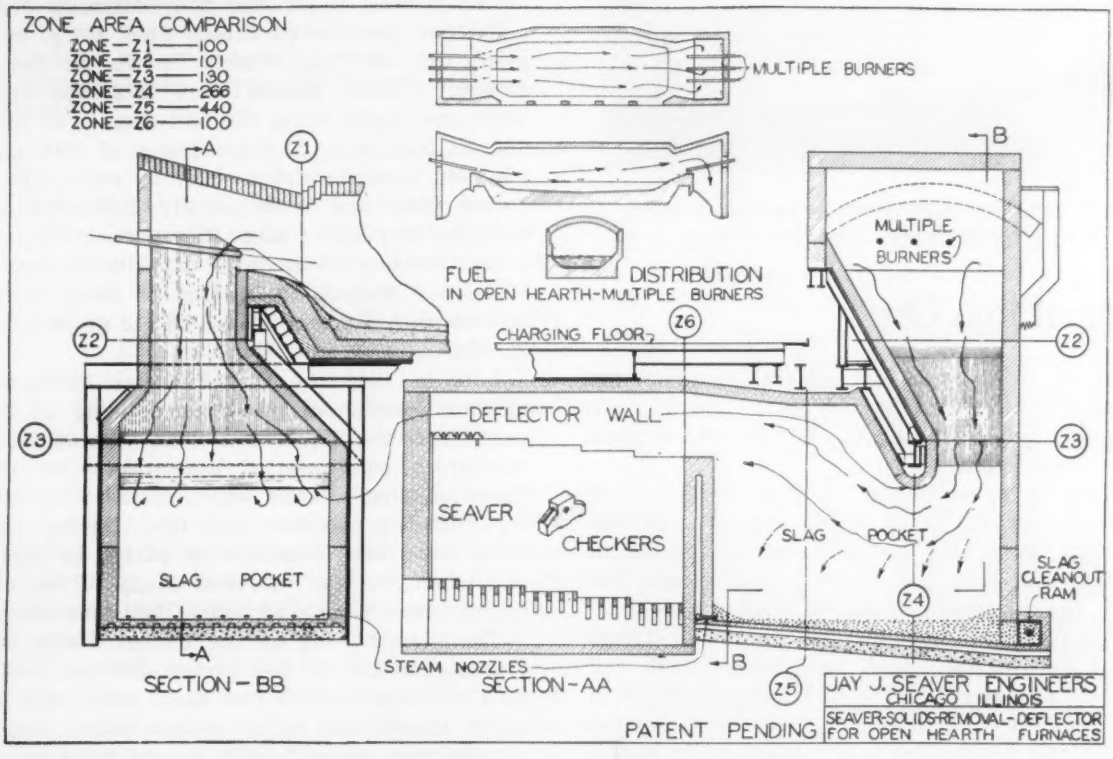
introduce



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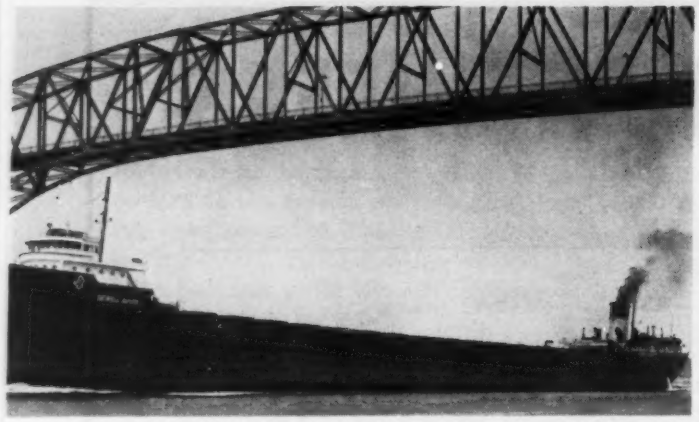


Fig. 9—View shows a freighter upbound light under the Bluewater bridge from Port Huron

Handling of Iron Ore

spaced either on 12 or 24-foot centers. However, the later vessels followed the 24-foot center type as loading was only being done on the 12-foot center boats at every other hatch.

Since the days the 60-foot ill-fated *Griffen,* built in 1679 at Cayuga Creek above Niagara, carried La Salle to Green Bay and was lost on the return trip loaded with furs, the design of lake vessels has reflected the physical limitations and cargo characteristics found nowhere else in the world. Large bodies of open water, shoal connecting rivers and locks made necessary by the 350 feet difference in altitude between Ontario and Superior have directed the design and proportions of the lake carrier widely different from coastwise and ocean vessels. The current limiting dimensions above Ogdensburg, N. Y. are as follows: Upbound depth 21 feet, downbound depth 25 feet, Welland canal locks 765 x 80 feet, and St. Mary's river locks 1300 x 80 feet.

In addition, available seasonal depths in lower lakes ports increased or decreased by prevailing winds further limit the loading drafts. Of course consideration must be given to seasonal operation of 225 to 250 days yearly.

From sail to steam and for 300 years, commerce and settlers have traversed the waters of the Great Lakes, challenging the naval architect and shipbuilder to meet and solve ever changing demands for efficient transportation.

The bulk steamship companies on the lakes fall into two classes, steel company ownership and independent operation.

From 1929 until 1937 no new vessels were built. In 1937 the Pittsburgh Steamship Co., United States Steel Corp. subsidiary, built four vessels which were revolutionary so far as powering on lake bulk freighters was concerned. These ships were built with geared steam turbine of 2300 shaft horsepower with 440-pound water tube boilers equipped with automatic combustion controls. They were 611 feet overall in length, 586 feet length of keel, 60 feet beam and 33 feet deep, with a carrying capacity of 14,200 tons on a 22-foot draft. These vessels were of partly welded construction and were equipped with the Joseph Wood hatches. These hatches were developed by the late Capt. Joseph Wood. They were first installed on the steamer *William C. Atwater,* now the *E. J. Kulas,* in 1925. The hatches consist of a 24-inch coaming with a solid one-piece cover with a watertight gasket and clamps. The hatches are handled by an overhead crane which runs fore and aft on the deck. These hatches are a great safety feature and do away with tarpaulins and battening down.

In 1941 the United States Steel Corp. built five giant ore carrying vessels known as the "super dupers." These vessels were increased in length, beam and depth, being 639 feet overall, 67 feet beam and 35 feet deep. Turbine drives of 4000 shp were installed, being furnished steam by water tube boilers, stoker fired and automatically controlled. Modern electrical auxiliaries make these vessels the last word in ore carriers whose rated capacity is about 18,500 tons on a 24-foot draft. One of these vessels, the *Benjamin F. Fairless,* loaded 18,913 gross tons of ore in 1947.

Late in 1942 the United States Maritime Commission commenced plans for building 16 bulk ore carriers of the 15,500 ton class. Various steamship companies consummated agreements for the purchase of these vessels which included an allowance for turned-in obsolete tonnage. During 1943 and 1944 these new vessels were placed in commission and when the war was over many of the old well-known small vessels of under 7500 tons disappeared.

The vessels built by the United States Maritime Commission are 620 feet overall, 595 feet keel length, 60 feet beam and 35 feet deep, with 3000 shp and carry 15,500 tons at a 24-foot draft. Due to the critical war period which caused machinery shortages, these vessels were powered with triple expansion engines with many refinements. Higher steam pressures were used which were furnished by modern water tube boilers with automatic combustion controls. These vessels have produced good performance records, making fast round trips of six days and carrying good loads. The average lake freighter makes the round trip from the lower lakes to the head of lakes and return in about seven days.

Inland Steel Company recently launched the largest

Fig. 10—Launching the largest and most modern ore freighter used on the Great Lakes. This vessel was designed to carry 20,000 gross tons at an estimated speed of 16 mph

REPRINTS AVAILABLE

REPRINTS of previous articles in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department. STEEL, 1213 W. Third St., Cleveland 13, O. Subjects covered over the past few months include blast furnace, open hearth and electric furnace practice, tool steels, roll design, coke production, plates, sheets and strip, tin plate, structurals and rails, scrap, bessemer steel, butt and lap weld pipe, seamless tubing and stainless steel.

freighter on the Great Lakes at the famed American Shipbuilding Co. yards in Lorain, O., the birthplace of many fine ships. This vessel, known as the *Wilfred Sykes,* is 678 feet long, 70 feet beam, 37 feet deep, and was designed to carry 20,000 tons. She is gigantic in size with 7000 shp giving her an estimated speed of 16 mph.

Practically all of the vessels are now equipped with radio direction finders, gyro compasses and radio telephones.

Shores of the lakes at various points have government maintained radio stations which send out signals that are picked up by the ships' radio direction finders. By the reception of these signals bearings are plotted so that vessel position may be found and checked.

Gyro compasses are almost standard equipment on the Great Lakes on every vessel. Due to the number of large scattered ore bodies interfering with the magnetic compass, the gyro compass is invaluable as a navigating instrument.

The Great Lakes radio telephone system is the most modern, efficient and complete in the world. Its primary and basic concerns are safety and navigation. It is also used to a great extent for operations and has many advantages for affording efficient dispatch.

With this modern radio telephone setup help is within easy reach to distressed ships and injured or sick personnel. Its safety advantages cannot be estimated.

Since cessation of hostilities of World War II the installation of radar on lake vessels has taken place at a rapid rate. At the present time almost one third of all vessels that ply the lakes is now equipped. A commercial set with 1, 3, 5, 10 and 25-mile ranges has been developed for lake use.

This all-seeing eye is a great aid to safety and navigation of these large lake ships during fogs, snowstorms and heavy weather or poor visibility. Many collisions and groundings have been avoided with this remarkable scientific instrument.

The average Great Lakes vessel carries a crew of 33 to 37. There are eight officers, including the captain, first mate, second mate and third mate, known as the forward end or deck crew; the chief engineer, 1st assistant engineer, 2nd assistant engineer and 3rd assistant engineer compose the after end engineer's crew. These officers have in their crew unlicensed personnel as follows: 3 wheelsmen, 3 watchmen, 3 deckwatches and 3 deckhands who compose the deck crew; 3 oilers, 3 or 6 firemen and 3 coalpassers, composing the engine room crew. The steward's department is composed of a steward, 2nd cook and two porters. These crews work on a basis of watches, four hours on duty and eight hours off except for deckhands and the steward's department who are considered day workers.

These crews generally work from the middle of March when the vessel fits out until December when the vessel lays up for the season. These crews report back year after year.

(*To be continued*)

Catalog on Tilting Furnaces

SKLENAR reverberatory tilting furnaces for the melting of nonferrous metals and iron, ferromanganese, copper ferrite and malleable iron are described in a four-page catalog released by Bellevue Industrial Furnace Co., Detroit 7, Mich. The furnaces, with capacities from 500 to 2000 pounds are capable of producing from 13 to 21 continuous melts per eight-hour day. Each is shipped as a self-contained unit, complete with burner, blower, motor and air ramp. It is stated that all that is required for installation is a level foundation, air, electrical and gas or oil supply lines.

Oxygen Output: 10 Tons Daily

OCCUPYING a floor space of 24 x 32 feet, is an oxygen plant which is capable of producing 10 tons of 95 per cent purity oxygen per day. Raw material used is normal atmospheric clean air. A cold box measuring 8 x 10 x 32 feet encloses three-quarters of the fractioning tower and all exchangers and cold piping of the equipment, made by Stacey-Dresser Engineering Division, Stacey Brothers Gas Construction Co., Cleveland.

There are prefabricated piping and only five pieces of equipment outside of the cold box. Maintenance costs reportedly are low, inasmuch as there are only two pieces of running equipment. Weight of the equipment, including insulation, cold box, and excluding foundations and shelter for equipment outside of cold box is 80,000 pounds.

Movie Shows Stud Welding

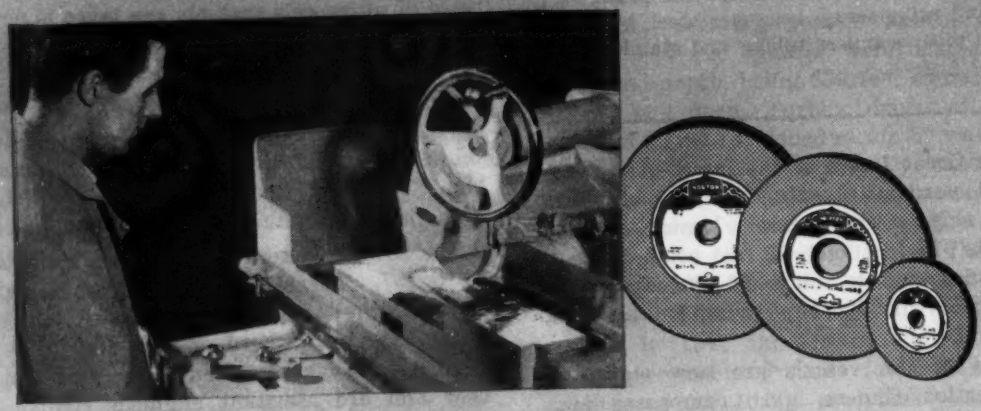
APPLICATIONS of stud welding in the manufacture of automobiles, electrical equipment, production machinery and in construction, shipbuilding and railroad industries are shown in an 18-minute color sound motion picture, "Split-Second Fastening," available from Nelson Stud Welding Division of Morton Gregory Corp., Lorain, O. How the automatic end-welding technique is used to cut production cost is shown, along with animated sequences.

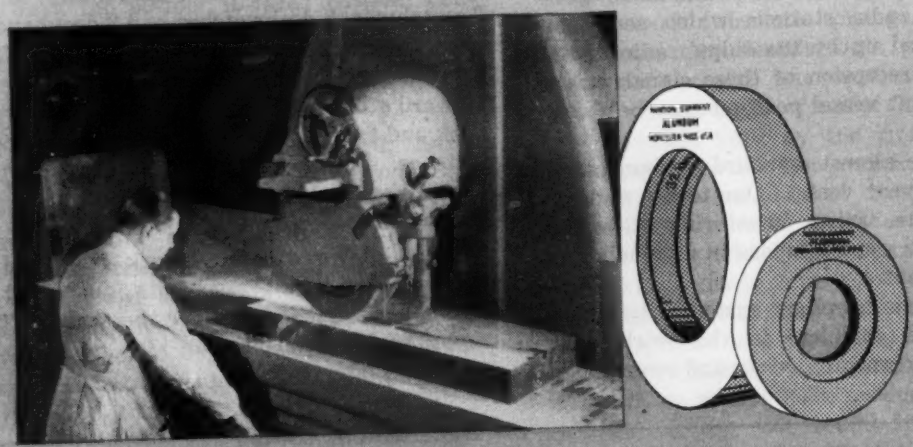
Plating Correspondence Course

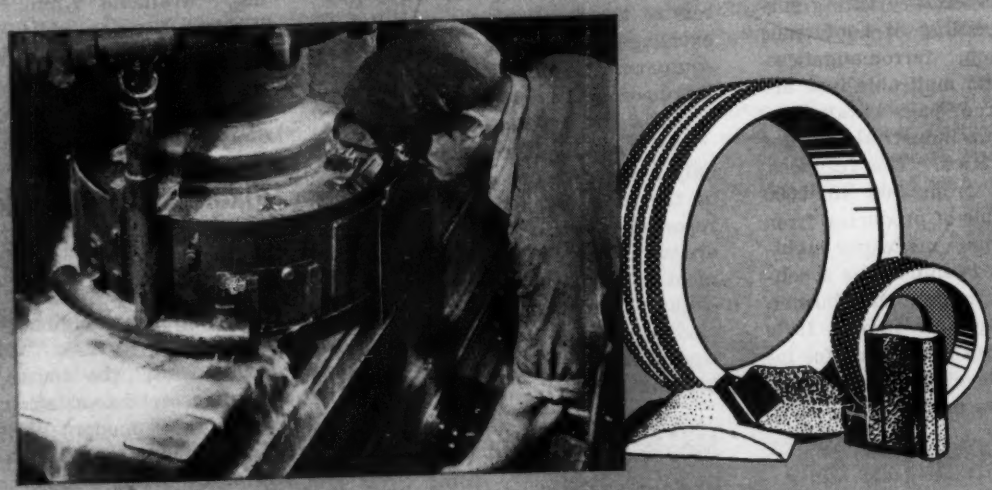
A CORRESPONDENCE course for those interested in electroplating is being formed by Joseph B. Kushner, metal finishing engineer of Stroudsburg, Pa. Entitled "Electroplating Know How," the course is intended to give a solid foundation in the basic concepts of modern plating practice.

The course may be taken informally as a reading and survey course or may be taken formally for a certificate, as the student desires. It is given over a period of 4 months and covers in a comprehensive manner all developments of modern electroplating, including those of recent origin.

Looking for Lower







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Chrome Pipe Welding

(*Concluded from Page 94*)

Layer*	Rod Size	Electrode Description	Motion	Mean Voltage	Mean Current
1st	5/32	E-502	Bead	22-24	40-70
2nd	1/8	E-502	Bead	23-25	65-110
3rd	1/8	E-502	Bead	23-25	65-110
4th	5/32	E-502	Weave	24-26	100-140

* See Fig. 1.

Weld metal is deposited in four layers, as shown in Fig 1, with practically no undercutting on the side walls of the welding groove or the adjoining base material permitted. All slag or flux remaining on any bead must be removed, of course, before laying down the next successive bead. Cracks or blow holes that appear on the surface of the bead may be removed by either chipping or grinding before the next bead is applied. Light peening is permitted if necessary. On the under side of the welding groove, full penetration must be achieved without the use of backing rings. Preheating must be uniform adjacent to the weld until it has been completed. Upon completion of the weld a heat treatment is applied consisting of heating to 1550 to 1600° F, cooling to 50 to 100° per hour to 1200° and air cooling from 1200°.

Usual procedure is this alternate heat treatment method which calls for preheating by maintaining 600 to 800° uniformly adjacent to the weld until it is completed, using Tempilstiks for temperature control during either gas or electric heating. Immediately upon completion of the weld, heat is applied by gas or electricity until 1200 to 1350° is reached. Then the pipe is wrapped in 1-inch thick asbestos and the weld allowed to cool to atmospheric temperature.

Constant Control—Proper welding of 4-6 chrome pipe, according to company officials, requires constant control of preheat procedure as well as post-heat temperatures during continuous welding. Company inspectors concentrate on quality production even at the expense of quantity.

Chrome pipe, prior to bending, is packed with sand. This is accomplished by means of a welded closure on one end and by stuffing the other end with burlap after filling and packing of dry sand is completed. The sand is inserted by means of a winch hoist and hopper and bending is done on a cast iron bending slab, pinned down and pulled with a winch after the heating operation.

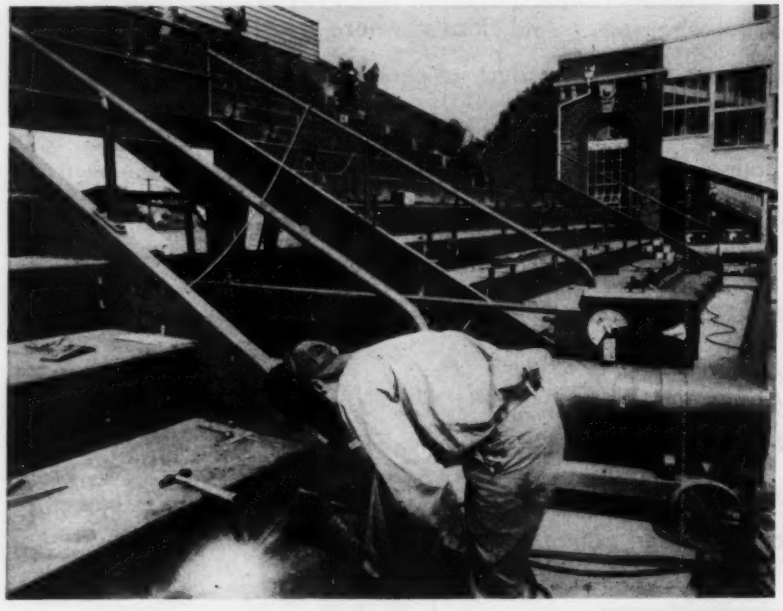
Welding equipment includes twenty-five 300-amp and five 200-amp Lincoln shield arc dc welders.

The company does piping engineering in addition to manufacturing fabricated pipe and steel.

Routing Procedure—Normal routing procedure at Houston is designed to save manhours and reduce lost time to a minimum. The pipe is routed from the stock pile to the cutting machine, where it is cut and beveled by the flux injection method. Sketches show the measurements and the pipe is cut to permit fabricators to fit it into the desired design. It is then segregated according to sketch and moved to fabricators who complete the sketch and fit the different pieces together by tack welds.

The pipe is then taken to the welder where unwelded butts are preheated to the 600° minimum. Welds are made, by rolling or positioning, in six passes, each weld being cleaned thoroughly after each pass. Much time is saved by providing each welder with plenty of room.

Heat treating from 1250 to 1350° is then accomplished by torch and then the asbestos wrapping takes place and the pipe is allowed to cool to atmospheric temperature. Pipe to be bent prior to welding is transported by overhead crane to the pipe-bending department, where it is packed with river-bottom sand, heated to 1650°, bent and checked.



BUT FEW ON THE 50-YARD LINE: Original seating capacity of University of Michigan stadium, Ann Arbor, was increased from 76,000 to 97,000 by the addition of an all welded steel seating section on top of the present concrete stadium. Steel plates, ¼-inch thick, were formed into a single step section, then welded in the shop into 4-step sections by Whitehead & Kales, Detroit. Field welding of the 15 foot long preformed sections was done with welding machines and electrodes furnished by Lincoln Electric Co., Cleveland. Seat supports were welded to step sections and wooden seat boards fastened to these supports

Steel Analysis Time Cut

(*Concluded from Page 93*)

Temperatures well in excess of those required for complete fusion were obtained. The highest temperature was reached after fusion had taken place. Measurements indicated maximum temperatures of 3450° F. Melting of titanium and zirconium in a flow of oxygen has been successfully accomplished with this unit although some ingot iron had to be added to the zirconium. This suggests other interesting possibilities still to be investigated such as the determination of the selenium content of steels and irons. And so the magic of electronics has entered the field of steel analysis. We believe it will find an important place.

Aquires Drill Head Line

AUTOMATIC air hydraulic drill head formerly made by Cleveland Republic Tool Corp. has been acquired and is being added to the line of Delta-Milwaukee power tools manufactured by Rockwell Mfg. Co., Milwaukee. Models with 1/3 hp and 1½ inch maximum stroke, 1½ hp and 4-inch stroke and with 5 hp and a 6-inch maximum stroke are to be offered with direct motor drive, in combination with gear reduction drives and also with a pulley drive.

How To Apply Metal Coatings

(*Continued from Page 87*)

0.00002 mm thick 2 x 10^{-5} ohm-cm as compared to 2.8 x 10^{-6} ohm-cm for massive metal. In spite of the extreme thinness, metal films act as a partial barrier to water vapor. In general, however, they are more valuable for their excellent optical properties than for other physical properties.

One of the original uses for the evaporation process was for the laboratory. Aluminum evaporated on the front surface of optical mirrors gave excellent reflection characteristics as compared with the familiar silvered mirrors. There is no interference from refraction, reflection, or absorption from the glass; and over 90 per cent of the incident light is specularly reflected. Today, large astronomical mirrors are coated with aluminum by special setups.

Some light bulbs are coated with aluminum on the inner surface to increase the efficiency in a given direction. In this case, the glass bulb itself is used as the vacuum vessel and the entire inner surface is coated. The aluminum covering the area which is to be transparent is then dissolved away by chemical means. The modern sealed beam headlight is a typical example of this art, wherein the aluminum coating acts not only as a reflector, but focuses the beam as well.

Quartz crystals have been coated with gold to load them to respond to definite frequencies, and silver coatings have been used as bases for soldering electrical leads to these crystals. Silver coatings have been evaporated on mica sheets and these sheets stacked to form high quality condensers.

Coating of Plastics—The metallizing of plastics presents various problems not met with in the coating of glass and ceramics. Glass and ceramics present the problem of cleaning so that the metal coating will be of good quality, but offer no problem so far as the vacuum system itself is concerned. Plastics, on the other hand, present both problems in cleaning and problems in the actual coating process.

Some plastics may contain absorbed moisture, plasticizers, traces of unpolymerized monomer, or accidental contaminants which may evaporate from the plastic when it is placed under vacuum. These vapors add to the amount of gas which the pumping system must handle and tend to lengthen the time required to evacuate the system to the pressure required for successful coating. If the metal is evaporated before the plastic is sufficiently "outgassed," a metal coating of burned appearance is likely to result.

However, a number of plastic types can be successfully metallized by the vacuum-evaporation process. In general, highly plasticized materials offer difficulty in metallizing, although the degree of success is dependent to some extent on the type of plasticizer used. Aluminum is usually deposited when a silver-appearing coating is desired; aluminum has the great advantage of being resistant to tarnishing under ordinary conditions.

TABLE I

TYPES OF PLASTICS WHICH HAVE BEEN METALLIZED BY VACUUM EVAPORATION

Plastic	Metals Applied
Methyl methacrylate (molded & cast Plexiglas & Lucite)	Aluminum, silver, gold, copper
Polystyrene	Aluminum, silver, gold, copper
Allyl (Cast CR-39 and Kriston)	Aluminum
Vinyl chloride acetate (unplasticized rigid sheet)	Aluminum
Nylon (cast)	Aluminum
*Cellulose acetate	Aluminum
*Cellulose acetate butyrate	Aluminum
*Ethyl cellulose	Aluminum
Polyethylene	Aluminum
Polytetrafluorethylene	Aluminum
Vinylidene chloride	Aluminum
†Thermosetting plastics	Aluminum

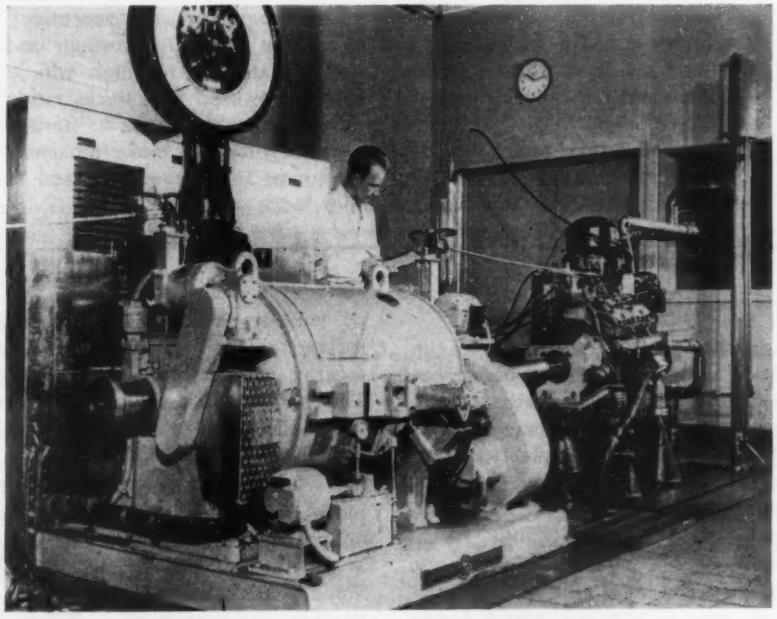
* Cellulose acetate and ethyl cellulose articles vary considerably in their coating characteristics. Molded products seldom can be successfully handled; sheet materials offer more promise despite outgassing problems.

† Most thermosetting plastics outgas but little. The filler used seems to affect the coating characteristics.

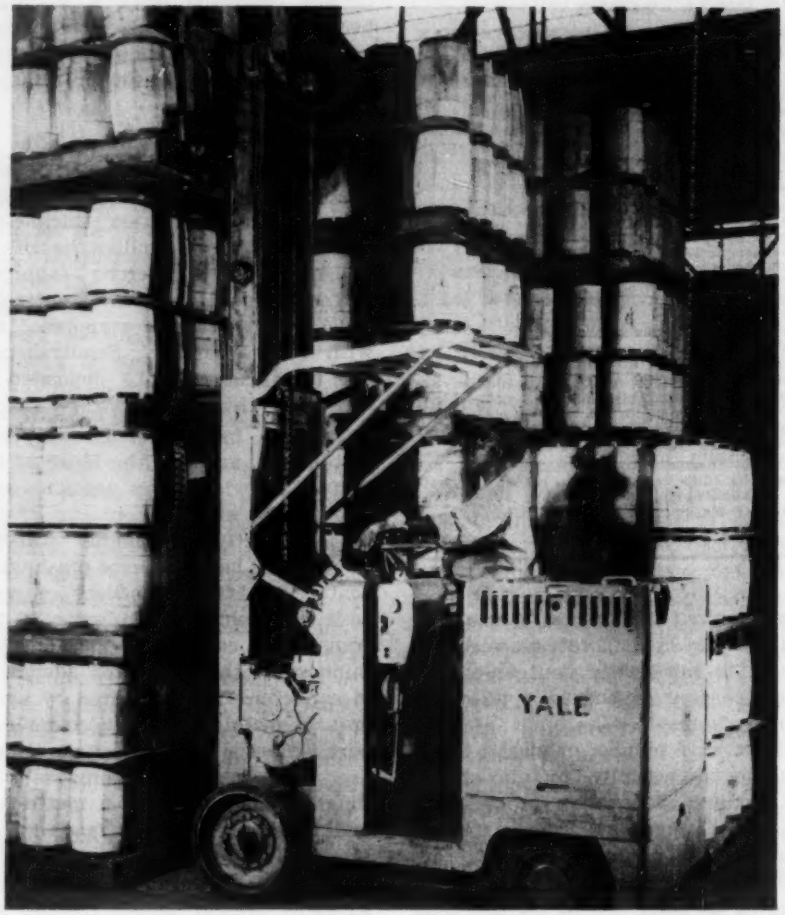
(Courtesy National Research Corp.)

Characteristics of Metal Film — Metal films deposited by vacuum evaporation are quite thin opaque coatings, ranging from thicknesses of 0.1 micron (4 millionths of an inch) up to 2 microns (approximately 1 ten-thousandth of an inch). Thicker films can be evaporated but with added difficulty. Semitransparent films can also be deposited in controlled thicknesses.

The film, because of its exceptional thinness, assumes the finish of the surface on which it is deposited and follows the surface contours of the object exactly. A highly polished surface will have a mirror finish when coated; in fact, excellent mirrors have been obtained on some of the transparent cast sheet plastics. This thinness of the film is of advantage in capacitors manufactured by evaporating metal onto a dielectric support. More compact capacitor units are thus possible. Conversely, a rough surface will give a matte-type metal finish. Any surface defects show up markedly when an object is metallized. Finger marks and similar smudges present before coating ap-



LATEST ENGINE TESTING EQUIPMENT: One of 10 direct current dynamometers made by General Electric Co., Schenectady, N. Y., is shown in operation testing a Ford V-8 engine in the research laboratory of Ford Motor Co., Dearborn, Mich. All 10 units incorporate motor-rotated trunnion ball bearings and remotely operated stator locks. They are rated at 200 hp absorption, 150 hp motoring, 2500/6000 rpm, 250 v and are among the first of a new design featuring base-mounted blowers



STORY OF KEGS AND PALLETS: Introduction of a fork truck and pallet system in the Aliquippa, Pa., nail warehouse of Jones & Laughlin Steel Corp., has cut keg breakage by 40 per cent, made it possible to tier kegs eight high and has eliminated manual stacking operations. With heads nailed in place, kegs are taken from a gravity conveyor and palletized on 48 x 48-inch pallets; they are stacked two-high with a plywood sheet between for stability. Electric-powered fork trucks made by Yale & Towne Mfg. Co., Philadelphia, transport the loads to storage and Yale telescopic trucks tier pallet loads four-high to make maximum use of overhead space. Pallet type Worksaver trucks are also used to move single pallet loads

pear plainly in the metal film.

Adhesion of the metal film to the plastics varies. Excellent bonds between metal and the methacrylate, polystyrene, nylon, and some samples of phenol-formaldehyde plastics have been obtained. Adhesion is determined by applying a piece of scotch tape to the film and pulling it off sharply.

Because of the thinness of the metal film, it will not stand heavy wear or scratching, although moderate handling is possible. For decorative finishes the metal film is protected with a thin coating of a transparent lacquer. The lacquer used must be chosen with due regard to the type of plastic base; if the lacquer contains high concentrations of solvents which would normally soften or dissolve the plastic base, crazing of the metal film occurs. The lacquer must therefore be definitely tailored to fit the particular application.

Not Adaptable to All Shapes—This method of metallizing is not readily adaptable to all shapes and designs of an object. Reason for this is obvious when the mechanism of the process is considered. When the metal vaporizes from the filament, the metal atoms move out into essentially free space. There are few air molecules for the metal atoms to strike, and therefore, most of the metal atoms travel in straight paths until they strike a cool solid object. For flat objects this means that only one side of the object can be coated at once unless filaments are set up on both sides of the object.

Irregularly shaped objects may have areas which are shadowed from the filament and may remain uncoated. Cylinders and spheres will be unevenly coated unless they are rotated during evaporation of the metal so that all areas have equal exposure to the metal vapor. This problem is more critical with aluminum than with gold, it having been noted that gold tends to diffuse to a much greater extent and give "back coating" which then can be used to some advantage.

Until recently, most emphasis has been placed on vacuum coating by batch methods. Now, a great deal of effort is being placed on the use of continuous methods, and it is expected that many new fields will be opened up for metal evaporation techniques. Additional uses for vacuum evaporation will undoubtedly suggest themselves as designers and manufacturers become more familiar with the possibilities of this method of metallizing.

TABLE II

TYPICAL EVAPORATION TEMPERATURES FOR A FEW METALS

TEMPERATURE AT WHICH THE VAPOR PRESSURE EQUALS 0.01 MM MERCURY

Name	Melting Point, °F	Evaporation Temperature, °F at 10^{-5} mm Hg
Aluminum	1216	1832
Antimony	1166	1256
Beryllium	2349	2462
Cadmium	608	518
Carbon	>6300	5432
Chromium	3452	2336
Copper	1983	2318
Germanium	1756	2372
Gold	1945	2660
Iridium	4449	>4350
Magnesium	1204	842
Molybdenum	4748	4532
Nickel	2646	2624
Palladium	2827	2822
Platinum	3191	3812
Selenium	359	389
Silver	1760	1922
Tantalum	5162	>4500
Tin	450	2462
Tungsten	6132	5790
Zinc	788	644
Zirconium	3866	>3600

REFERENCES

1. "Vaporized Metal Coatings by High Vacuum," Distillation Products Inc., Rochester, N. Y.
2. Based on information supplied by National Research Corp., Cambridge, Mass.

Aeronautical Material

AVAILABLE from the Society of Automotive Engineers Inc., New York 18, N. Y., are 12 new specifications and 17 revisions of former specifications for aeronautical material. Included are such specifications as cadmium plating, aluminum brazing, aluminum alloy forging extrusions and castings, nickel-copper alloy tubing and valve steel. All specifications are available individually or as a complete set.

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Radiant Heating Under Test

RESULTS of radiant panel heating tests with fin tubes in a drafty steel classroom building will go far in determining the value of the system under all conditions, according to those in charge of tests being conducted at Michigan State College, East Lansing, Mich. The newly developed fin tubes consist of straight copper coils with series of thin and closely-spaced fins attached perpendicular to the coils. Heat from the coils is conducted to the fins, greatly increasing the heating area and consequently the radiation from the panels.

Hot water, steam or air is forced through the coils which are arranged between the studdings or, in some cases, are imbedded in the plaster. The point to be determined will be whether, with the addition of aluminum fins, the coils can give off heat adequate for buildings under all kinds of climatic or structural conditions.

ASTM Symposium on Lubrication

PROPER lubrication of turbine-driven gears and worm gears which are used in turbines is pointed out to be of vital importance to the manufacturer, refiner and customer, by F. C. Linn, of the General Electric Co., Schenectady, N. Y., in his introduction to a symposium on lubrication of that type of equipment. Published by the American Society for Testing Materials as technical publication No. 92, it includes four papers. Clear picture of the operating problems and design problems plus what has been accomplished in perfecting the gears and lubricating systems is presented in the 32-page paper-covered publication offered by the society, 1916 Race St., Philadelphia 3, Pa.

Bar Stock Cross Index

BAR stock specification numbers of various groups and organizations are correlated in a booklet available from National Screw Machine Products Association, Cleveland 20, O. Materials covered are carbon, free cutting, manganese, nickel, chromium, molybdenum and stainless steels, plus a number of brass, bronze and aluminum types.

PLATING IMPURITIES

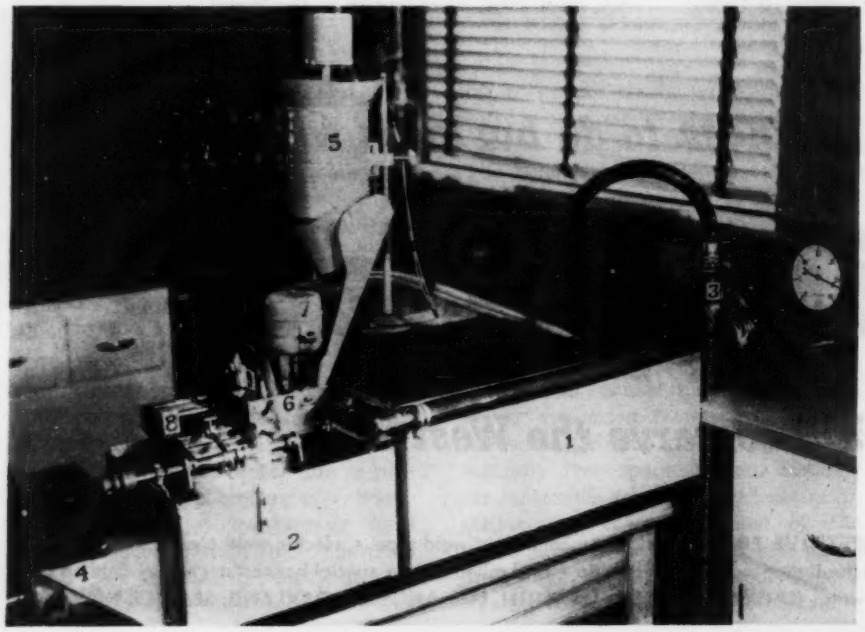
Removed Automatically

COMPLETE removal of solid impurities in continuous or intermittent operation is the function of a new filtering system developed for permanent installation in electroplating and other processing setups. Said to require a minimum of maintenance attention, the automatic system works efficiently with all types of solutions; difficult slimes such as those from cyanide plating tanks, and those composed of iron and aluminum hydrides have been successfully filtered.

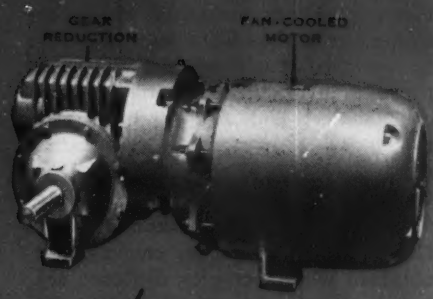
A development of Commonwealth Engineering Co., Dayton, O., the system employs the passage of a solution through a layer of filter which is removed as rapidly as it becomes clogged with impurities and immediately replaced with fresh material. A revolving drum with a perforated cylindrical surface is coated with a filter aid of a diatomaceous or comparable type. Drum is submerged in the filter tank which is directly connected to the plating tank by piping. Under the influence of suction supplied by a pump, the solution passes through to the interior of the drum and impurities are trapped in the filter cake. Clear filtrate returns to the plating tank.

Spent Layer Removed—Self-cleaning function is accomplished by the drum revolving against a blade set at the top to remove the spent filter layer which is transported up a ramp and dropped into a disposal container. Back of the blade is the slurry chamber in which filter aid is removed from a hopper above and diluted with fresh solution from the plating tank. The aid deposits itself on the drum in a small segment exposed to the chamber to replace the spent layer as the latter is removed. An electrical control system regulates intermittent rotation of the drum and the slurry mixture to meet filtering operation requirements.

Filter design is said to solve the problem of the glazing upon the filter coating. Using aqueous solutions, the pilot apparatus in sustained operation has reached a flow of 5 gallons per minute per square foot of filter.



Design of self-cleaning filter which passes dirty solution from process tank (1) *to filter tank* (2), *through the filter and back to process tank by means of pump* (3). *Spent filter is removed from the drum at* (8), *while fresh material is metered from container* (5) *to make-up tank* (6) *and passed to the drum. Driving mechanism for removal of spent materials is* (4) *at left, while* (7) *is another motor*



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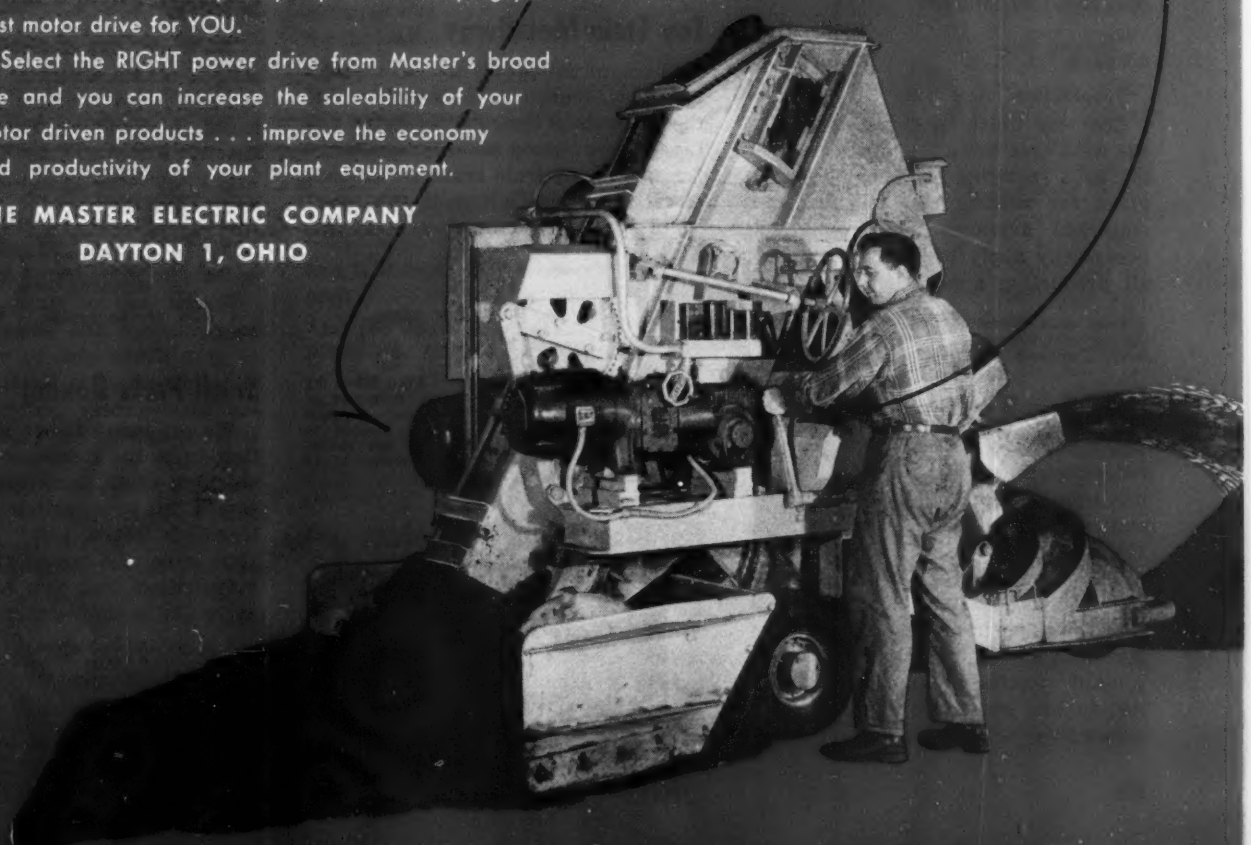


Welded Stampings

(*Concluded from Page* 90)

by injecting a "killing" action on the weld puddle. We have found that a chrome-manganese-silicon rod works very nicely for this purpose. Such filler rods as Norway iron, and low carbon mild steel are not suitable.

Welding Speeds—It is possible to realize welding speeds of 16 to 40 inches per minute when hand welding is employed. Such speeds have been proved on production applications consistently, and are attributed to the high temperature concentrated arc employed and the unobstructed visibility of the weld puddle due to the absence of smoke and spatter. High speeds, of course, can only be obtained where complex contours are not involved and where fit-up and hold-down conditions are good. We have previously pointed out that higher speeds (approximately 20 per cent higher) can be obtained when mechanized welding is possible.

Welding Costs—Cost of Heliarc welding will generally be greater than for other welding processes if no consideration is given to the other savings realized as a result of its use. Production applications on fenders and bodies of 0.037-inch stock have resulted in the following costs:

	Per lineal in.
Argon Gas	$0.00123
Tungsten Electrode	0.00004
Power	0.00003
Labor	0.00684
Approximate Total Cost	$0.00814

While not a welding cost, it probably should be pointed out here that finishing of 0.037-inch stock will cost about as follows:

	Per lineal in.
Sanding disks	$0.0022
Labor	0.0118
Approximate Total Cost	$0.0140

Cost for finishing covers not only the weld area but all of the surrounding area requiring finishing. Figures given for welding and finishing are empirical averages which will not necessarily apply to all contours, and all production applications.

From data presented by the authors before the national convention, American Welding Society, Cleveland, Oct. 17-21, 1949.

Hack Saw Recommendation

REVISION of simplified practice recommendation for hack saw blades has been approved for promulgation and will be effective from Dec. 15, 1949, according to Commodity Standards Division, National Bureau of Standards, Washington. It brings the simplified list of sizes abreast of current industry practice. Until printed copies of recommendation R90-49 are available, mimeographed copies may be obtained.

LETTERS *to the Editors...*

Cool Honing

In the Oct. 24 issue of your magazine there was an article on page 44 regarding new honing methods devised by S. H. Mack & Co. Inc. We would appreciate knowing if we could obtain literature on the type of coolant use in this honing procedure, as occasionally we do honing at our plant.

T. C. Hoey
Buyer and Material Expeditor
Hornell Division
SKF Industries Inc.
Hornell, N. Y.

We have no further information on the water base coolant used in the Studebaker honing operation. Further information might be available from Studebaker Corp., South Bend, Ind.—The Editors

Clear Presentation

I think you will find that purchasing executives welcome such a clear presentation of market information as you now present. Realistic coverage of prices and market conditions by the representative trade publications is one of the most valuable tools of management. So, I think you will find the industry, as well as purchasing executives and management generally, will welcome and appreciate this development.

G. A. Renard
Secretary-Treasurer
National Association of Purchasing Agents
New York, N. Y.

Toy Train Metallurgy

In one of the earlier issues of STEEL this year, there was an article about the methods of manufacturing by the Lionel Corp., using powder metallurgy for special toy train transformer construction. Please advise if you could supply us with tear sheets of this article.

D. A. Wilson
General Purchasing Agent
Canadian Westinghouse Co., Ltd.
Hamilton, Ontario

The article, "Designing for Production by Powder Metallurgy," by Joseph Bonnano of Lionel, concerned the economic and physical benefits of powder metallurgy as applied to model train parts manufacturing, not transformer construction. However, tearsheets are being sent.—The Editors

Re: Blast Furnace Locations

For a study of the blast furnace locations which we are carrying on at Western Reserve University, we should like to have a copy of the article written by A. H. Allen and John Knox entitled, "West's Industry Expansion Reminiscent of Gold Rush Days", published in STEEL during 1943.

Robert S. Nycum
Economic Research Office
Department of Economics
Western Reserve University
Cleveland, O.

Series of articles referred to ran in the August 16, 23 and 30, Sept. 6, 13, 20 and 27 and Nov. 4, 1943 issues of STEEL.—The Editors

Pensions-Pensions-Pensions

Will you kindly furnish us with a copy of Walt Campbell's "Guide to Metalworking Executives on Pension and Insurance Plans". Also furnish us a copy of his analysis of the pension problems facing the smaller plants.

W. O. Wetherell
Secretary & Treasurer
Ohio Ferro-Alloys Corp.
Canton, O.

We note in the Oct. 24th issue of STEEL in the "Behind the Scenes" column, under paragraph titled: "Again—Pensions Paragraphs" that reprints of Walter J. Campbell's discussion on insurance and pension plans in April are now available. We will appreciate receiving a copy of this reprint.

W. E. McMurray, President
Clearfield Machine Co.
Clearfield, Pa.

Copies of the article mentioned and a subsequent one entitled, "Small Companies Face Puzzling Pension Problems" are available from our Readers' Service Department.—The Editors.

Silicosis

We would like to know if it is possible to obtain a reprint of the article entitled, "How Timken Prevents Silicosis in Handling Silica Brick for Electric Furnaces", by E. M. Feiman, which appeared in the July 25, 1949 issue of STEEL.

D. G. Vaughan, Manager
Engineering and Inspection Dept.
Aetna Casualty & Surety Co.
Hartford, Conn.

A copy of the article is being sent.—The Editors

Small Parts Boxing

We are interested in more information as to the Belsinger box used for shipping small items which you mentioned in your article, "Packagers, Handlers Get a Lift," in your Oct. 10th issue. We would appreciate any information that you have available as to the manufacturer of this item.

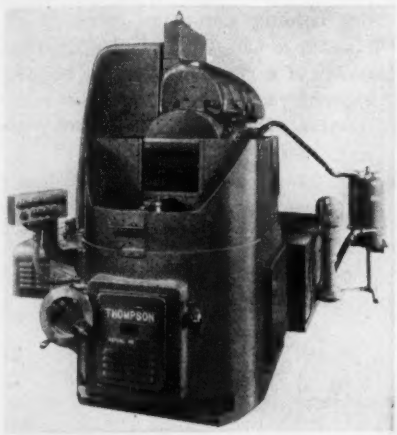
J. C. Kennedy
Wheatland Tube Co.
Wheatland, Pa.

We understand that there are five licensees furnishing the Belsinger box for small parts shipments. A list is being sent.—The Editors

New Products and Equipment

Contour Grinder Saves Time

A 300 per cent saving in time in the grinding of an 8-inch circular wood saw results from the use of a new Truform contour grinder, developed by Thompson Grinder Co., Springfield, O. Grinding wheel covers entire saw area to be shallow-tapered. Both grinding wheel and saw rotate in the grinding process.



Grinders for similar saws are available in 6 to 12 and 6 to 16-inch sizes. Crushing, trueing and working cycles of operation are automatic with fully automatic pushbutton control. Machines are compact with centralized control.

Check No. 1 on Reply Card for more Details

60 Stroke Per Minute Shear

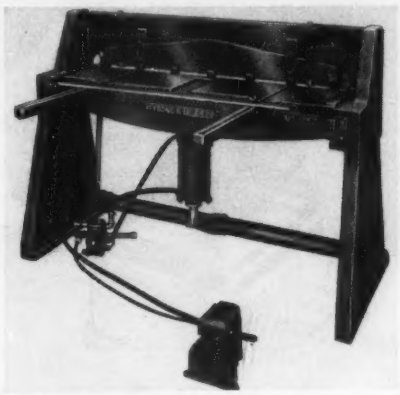
Loading table, automatic uncoiler, roll feed and stocker are synchronized and operated as a combined unit with the Cleveland automatic shear, built by Cleveland Punch & Shear Works Co., Cleveland 14, O. Shear itself is single-geared and equipped with an electrically-controlled air-operated jaw type clutch for operation at a speed of 60 strokes per minute. Due to the time required for feeding and measuring of stock, number of cuts which may be made at a given time is variable. The loading table, arranged to accommodate two coils at one time, is arranged so that coils are placed behind two series of stops.

After the first coil has been positioned on the uncoiler unit, the second coil can be moved forward to the stop nearest the uncoiler, permitting another coil to be placed on the loading table. Uncoiler is designed for coil stock from 12 to 96 inches wide, 72 inches OD, 16 to 30 inches ID, and 20 tons in weight. Roll feed consists of five straightening and four feed rolls. It is equipped with a variable speed automatically controlled measuring device which may be set for shearing material from 12 to 148 inches in length. Both sides of the stacker unit are adjustable by means of hand rachets.

Check No. 2 on Reply Card for more Details

Air-Operated Shears

Only 75 to 85 pounds of air pressure is needed to operate the line of air-power squaring shears announced by Wysong & Miles Co., Greensboro, N. C. Included are shears with cutting lengths of 36, 42, 52, 72, 96 and 120 inches. All are designed to cut 16 gage or less except the 96 and 120-inch shears which have a rated capacity of 18 gage.

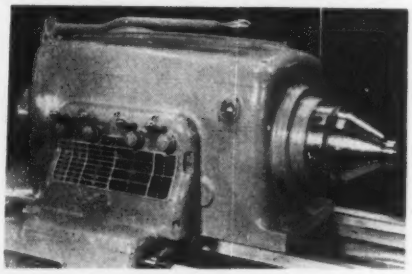


Each is equipped with air valve, cylinder and pilot valve and is ready for operation upon supply line connection. Standard equipment includes front, back and side gages, holddown and a stainless steel scale.

Check No. 3 on Reply Card for more Details

Lever Operated Collet

For application on series 60 engine and tool-room lathes, made by Monarch Machine Tool Co., Sidney, O., is a lever-operated collet attachment providing up to 1⅛-inch round bar stock capacity. For installation on these machines at the factory only, the attachment is designed for either



draw-in or pusher-type collets, both being identical except for the drawbar, collets and spindle nose adapter.

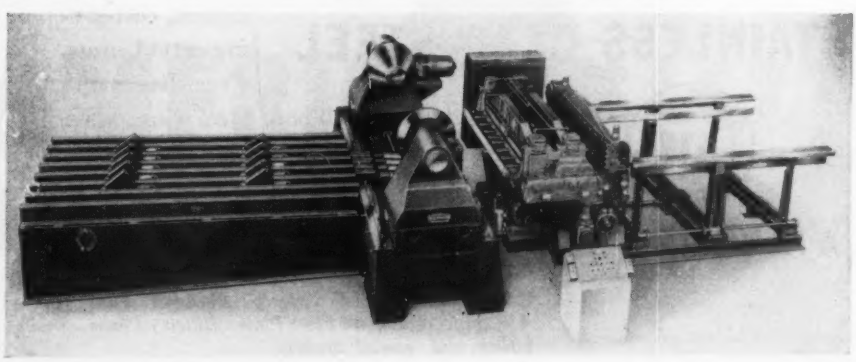
Drawbar removal is easily accomplished when collet attachment is in use. Relation between attachment and collet itself can be adjusted readily from exterior of machine at the left end of the headstock. Operating lever is positioned conveniently to the operator standing in the normal operation position.

Check No. 4 on Reply Card for more Details

Tool Reduces Setup Time

Set-up or make-ready time in lathes, vises, boring mills, on machine tables and in fixtures, as well as in electric drills and drill presses is saved by use of the IN-R-Tool, made by Layne-Held Corp., 2005 S. Shelby St., Higginsville, Mo. While the inner pressure workholding device has a number of applications, it is primarily an expanding arbor. Cores and pressure members that fit the splines of the cores are interchangeable. A ratio-limiting collar controls distortion of thin work.

Tool can be used as an expanding arbor when working between lathe centers or when used in chucks or collets. It can be used to make thin spacers from plate and work can be accurately gaged for thickness and diameter. Use may also be as a jig or part of a jig to save downtime.



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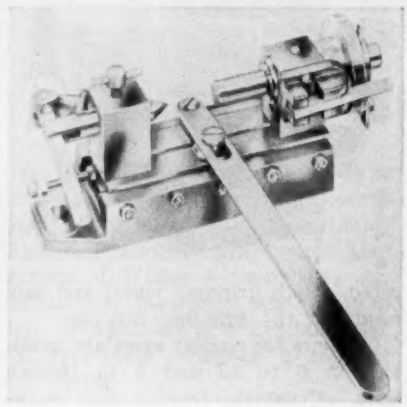
When used as an anchor, it acts as an inside, self-centering chuck with a tolerance of plus or minus 0.0015-inch. Tool has a range of from 1½ to 2¼ inches. Other sizes are available on special order.

Check No. 5 on Reply Card for more Details

Collet Unit Saves Tool Cost

Such operations as spline cutting, cross and small screw slotting, cutting of small pinions and squaring at different angles may be perfomed on a small hand miller with the No. 9 collet holding unit announced by H. B. Rouse & Co., Chicago 14, Ill. Unit consists of a right hand collet holding unit with a circular indexing plate in blank. Indexing blanks may be



milled by the purchaser for proper slotting or to specifications at the factory. An adjustable center unit to hold larger workpieces is available.

No. 9 unit saves time and tool costs when used as a jig on other machine tools such as drill presses, lathes and as a basic part of many other fixtures. It may also be used with a stationary base plate with either 7¼ or 11-inch sliding table on the Rouse hand miller. Sliding table has adjustable stops at both ends with a movement from left to right of 3½ inches with level control.

Check No. 6 on Reply Card for more Details

3-Jaw Chuck Features Speed

Ability to lock work in place with rapidity is a feature of the No. 75 3-jaw universal chuck developed by Westcott Chuck Co., Oneida, N. Y. Speed is made possible by inserting the end of a wrench stem into any one of six holes in the outside diameter of the scroll and then rotating the scroll rapidly by lever action. To secure a final tight grip, the wrench stem is slipped into any one of six additional holes adjacent to the scroll so that the wrench pinion engages

Make this note on your Xmas List:

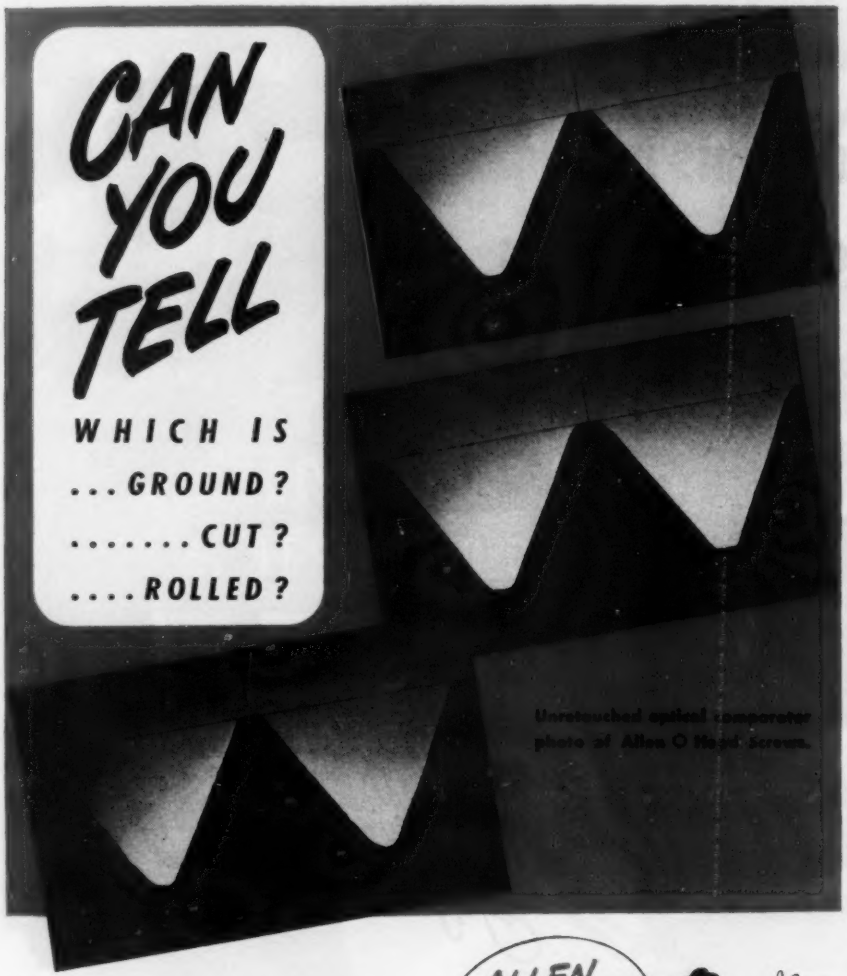
All through the dazzling displays, from toys to TV sets, you'll see . . . time and time again . . . the familiar face of the American Phillips Cross Recessed Head Screw. And whenever you see it, you're looking at a top product in its line . . . one that's obviously an exceptionally good buy because it's put together to stay, to withstand vibration and strenuous daily use. What's more, you can be sure that the lucky one who gets your gift *will see it the same way.*

Yes, American Phillips Screws are one of the most reliable outward signs of built-in quality. And if *you* are concerned with the manufacture of any product, then you may well have a far happier New Year in store for you, if you will let us show you how . . . in your own plant as in all others . . . *American Phillips Screws always cost least to use.*

AMERICAN SCREW COMPANY, Main Office: Providence 1, R. I.
Plants at Willimantic, Conn., and Norristown, Pa.
Warehouses at: *Chicago 11:* 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

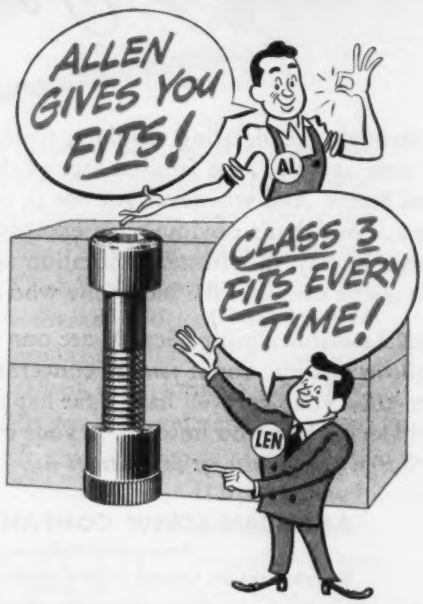
AMERICAN PHILLIPS *Screws*

ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)



Find it hard to decide? Don't waste your time because threading method is purely our problem. Your interest is in *Uniform Class 3 fit*. You get it every time when you specify Allen O Heads instead of just Allen-type screws.

We use all the accepted threading methods depending on the metal, the size and, in some cases, the application. We investigate every new development and incorporate the best into our manufacturing methods. Because we do not commit ourselves to any *one* method, we can give you the *extra* precision and uniformity that makes Allen O Heads fit smoothly and stay tight under the most gruelling service.



SOLD ONLY THROUGH LEADING DISTRIBUTORS

Write the factory direct for technical information and descriptive literature.

WARNING
Allen-Type screws aren't necessarily Allen-Made.
Get genuine "Pressur-Formed" Allen O Head screws in this black and silver box.

ALLEN MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.
NEW YORK, CLEVELAND, DETROIT, CHICAGO, LOS ANGELES
ALLEN HEAD

FOR 40 YEARS THE BUY-WORD FOR SOCKET SCREWS

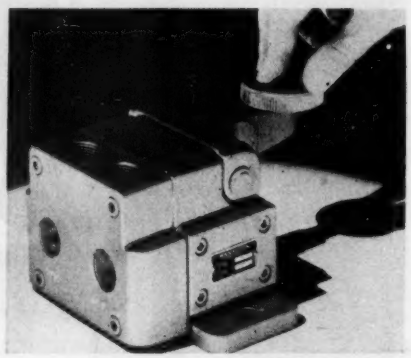
with the bevel gear teeth at the back of the scroll.

Chuck has solid reversible jaws for inside and outside chucking. It is threaded for direct attachment to a 1½ inch-8 thread lathe spindle. Mounting plate can be bolted to the table of a drill press or milling machine, converting it to a vise or machining fixture. Accuracy is guaranteed to center within 0.003-inch total indicator reading.

Check No. 7 on Reply Card for more Details

Valve is Pushbutton Controlled

Four-way directional air control for the operation of single or double acting pneumatic cylinders and other air-operated equipment is possible with a fast cycling type valve announced by Hannifin Corp., 1124 S. Kilbourn Ave., Chicago 24, Ill. Light



pressure applied by fingers, palm or knee to depress the control knob ⅜-inch is all the motion required to operate the valve. Air line pressure supplies the force to move the piston operated main valve.

Designated as model NHS, the valve features a reciprocating, packless, self-lapping main valve disk. It is available in ½ and ¾-inch sizes for use with air line pressures from 25 to 150 pounds. Control knob can be located on the end of an extended rod connected to the operating lever for remote control or simplified connections.

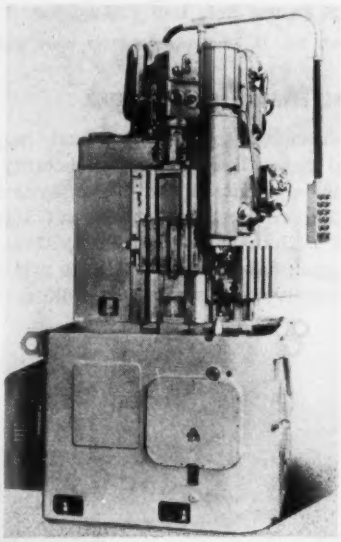
Check No. 8 on Reply Card for more Details

Lathe Uses Negative Rake Tool

Reed-Prentice Corp., Worcester 4, Mass., is manufacturing a vertical automatic production lathe for turning, boring and facing work which takes advantage of high-speed negative rake cutting tools. Control is by a central timer which, after the work has been chucked, starts the spindle, starts each slide to move at its appointed time, and, when the last tool has completed its work, stops the spindle.

Slides are independent of each

other and may be set to go through their motions at any time during a machine cycle. Feed boxes for each slide are identical and each is complete with its motor, hydraulic system for shifting the clutches and solenoid operated valves. For setting the machine, all movements may



be controlled by pushbuttons. Standard machine is equipped with one turning slide, one facing slide arranged to swivel, and a tailstock which may be replaced with a boring head when needed.

Check No. 9 on Reply Card for more Details

Lift and Lower Truck

Designed to lower and raise heavy loads between balcony storage areas and first floor production line is an elevator fork lift truck announced by Towmotor Corp., Cleveland 10, O. A special nontilt mast and carriage assembly permit the load carrying forks to be lowered 98 inches below floor level.

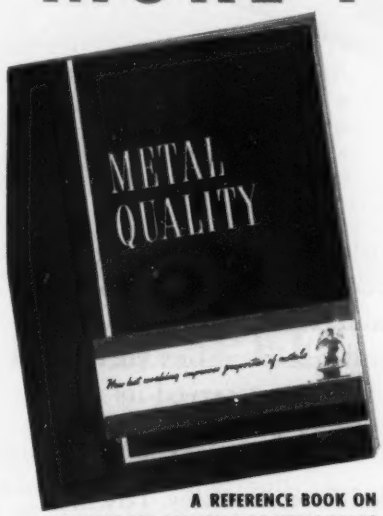
Mounted on a standard fork lift truck, the elevator unit has a lifting and lowering capacity of 2000 pounds. Full capacity loads may be lifted from first floor to 10 inches above balcony floor level.

Check No. 10 on Reply Card for more Details

Broach Cuts Screw Thread

Practically all sizes of machine screw threads commonly used in industry may be formed with thread-forming rotary broaches made by virtue of end pressure exerted by the cutting edge, rather than by radial pressure alone. Made by Shearcut Tool Co., P. O. Box 746, Reseda, Calif., the forming tools may be used in tapping machines, automatics, turret lathes, lathes or any machine

THE ONLY WAY YOU CAN BEAT FORGINGS AS A SALES FEATURE IS TO USE MORE FORGINGS



A REFERENCE BOOK ON FORGINGS FOR ALL USERS OF METAL PARTS

60 pages of authoritative information on metal quality as developed in forgings formed through the use of closed impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

● What a forging *has*—can't be duplicated! No other method of fabricating parts utilizes fully the fiber-like flow line structure of wrought metals. Thus, forgings provide matchless capacity for the toughest work loads and fortify your product for better performance. Forgings forestall and reduce downtime due to failure of highly stressed parts; provide a factor of greater safety for men and machines. A recheck of every stressed part, as well as simple handles and levers, frequently reveals opportunities to improve a product, to reduce the cost of machining and finishing or to speed up assembly. Consult a forging engineer—only a forging engineer can inform you fully regarding the many quality advantages and cost-reducing possibilities that are obtainable with forgings.

DROP FORGING ASSOCIATION
605 HANNA BUILDING
CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metals", 1949 Edition.

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TRAILER HITCH MANUFACTURER GAINS ALL 'ROUND IMPROVEMENT BY CHANGING TO

UNITCASTINGS!

AS A UNITCASTING
- Cost Substantially Less!
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This product was really planned from all angles! After the mechanical success of the pilot model, using a weldment, the manufacturer figured production costs, sales appeal and qualifications such as durability. Although the weldment served its purpose for experiments, *it didn't answer any of the marketing problems!*

Unitcast engineers solved the difficulties. Toward a quality product, *Unitcastings* contributed a low *finished* cost; the trailer hitch had eye appeal; and all parts were accurate and durable. The job had been made right with steel castings . . *foundry engineered to fit the job!*

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Unitcast will welcome the opportunity to provide a "cast steel" answer for your parts problems, too. Our suggestions toward design, *while your product is still on paper,* may save you many dollars in time and future revisions! Write or call today! Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

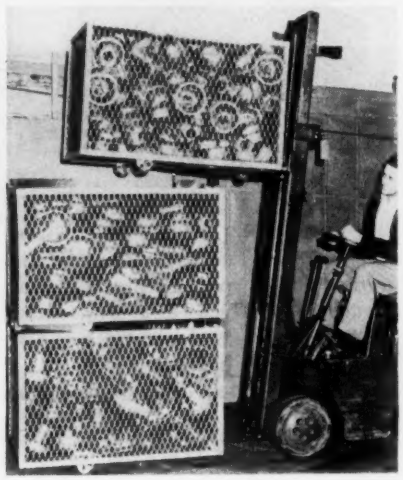
adapted for a tapping operation. They may also be used for hand operation.

Broaches are interchangeable with standard taps and can be supplied to requirements. Right hand spiral, right hand cut are standard. They require less power, work equally well in most materials and do not bind or seize in the hole being threaded.

Check No. 11 on Reply Card for more Details

One Man Tiering Truck

Stacking to any practical height and permitting complete visibility of truck contents is the basket type tier truck produced by Donaldson Co. Inc., 666 Pelham Blvd., St. Paul, Minn. It is equipped with two wheels and one full-swiveling caster for rolling the



truck to production machinery or assembly line.

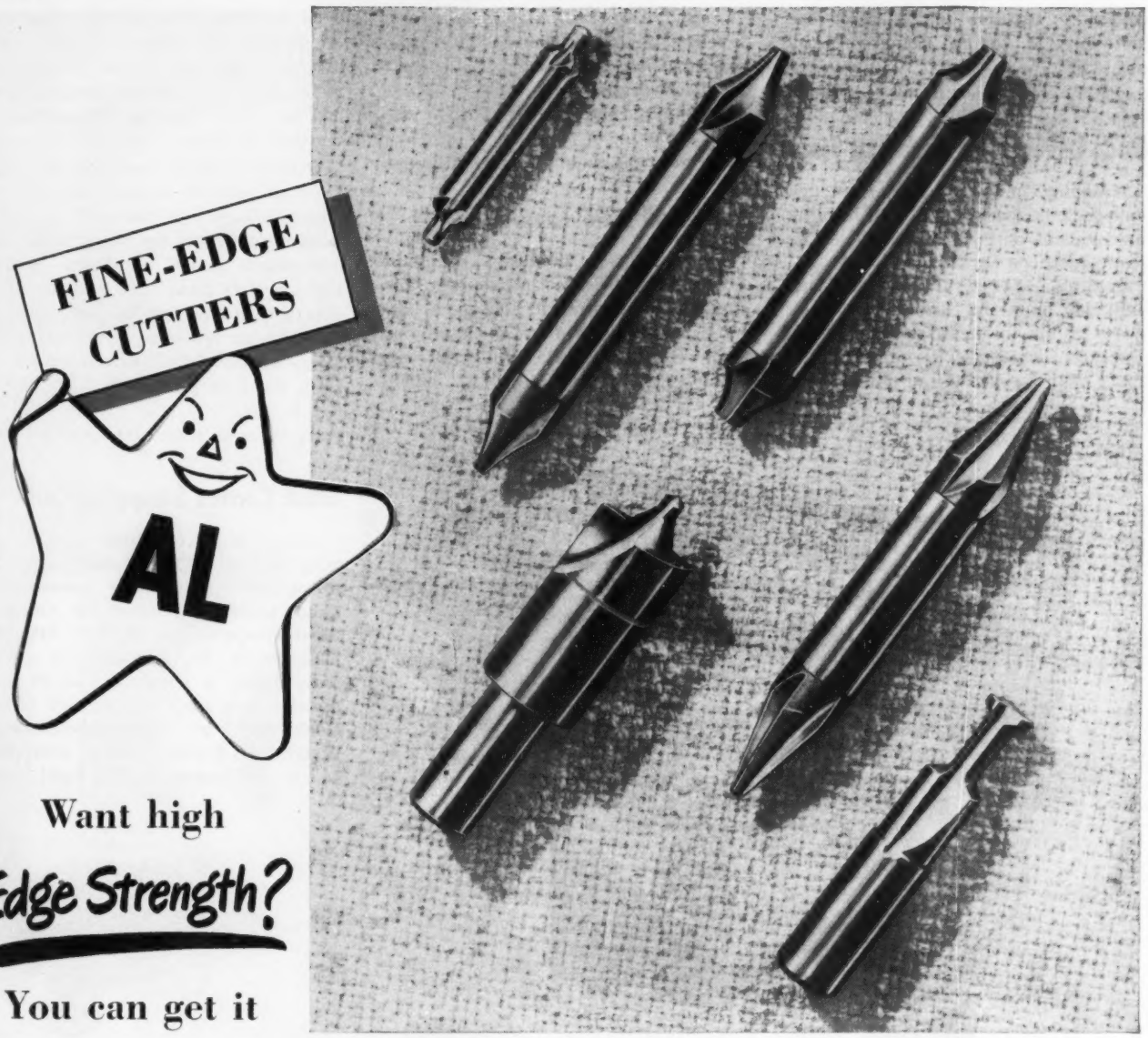
Standard lift-truck forks easily handle tier trucks, whether they are on the ground or stacked. A self-aligning feature makes it possible to center one basket on another. The one-man truck is constructed of heavy angle iron frame and heavy-duty expanded metal basket. Dimensions are 30 x 32½ x 48 inches and capacity is 1000 pounds. Volume is 25 cubic feet.

Check No. 12 on Reply Card for more Details

Portable Belt Booster

Available with belts 6 to 36 inches wide and in lengths of 12, 15, 18, 20 and 24 feet is a portable belt booster manufactured by Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y. For use as a floor-to-floor conveyor and stacker, it is offered with various capacity motors, depending on load to be carried. Either slider or roller bed construction is available.

Unit may be furnished with power-driven tail feeder and wheel or roller gravity section or nosed-over delivery. Screw-jacks in raising mechanism in-



Want high

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Write for copy of

"CUTTING TOOL MATERIALS"

Allegheny Ludlum produces *all* types: the various tungsten and "moly" high-speed steels, cast-alloy materials, and cemented carbides. This 36-page booklet analyzes and compares types, and covers grade selection, etc.—invaluable data for production men. *Write for your copy.*

ADDRESS DEPT. S-82

A midwestern tool manufacturer, specializing in fine-edge cutting tools, has found DBL-2 *best* for their purpose—added proof of the high edge strength and excellent cutting qualities of this high-speed steel.

DBL-2 (typical analysis: C .80, W 6.00, Mo 5.00, Cr 4.00, V 1.75) represents the 6-6-2 or M-2 type of tungsten-molybdenum high-speed steel. DBL-2 combines high hardness with toughness. Requiring no more than reasonable care in hardening and tempering, you will find it a high-speed steel of great possibilities—capable of giving you performance equal to, or better than, the general-purpose tungsten types, and at reduced cost.

DBL-2 reliability has been proved in a wide variety of cutting tools. Let us help you to use DBL-2 . . . our Mill Service Staff is at your command.

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STEEL CORPORATION

Pittsburgh, Pa.

TOOL STEEL DIVISION: DUNKIRK, N. Y

Fine Tool Steels Since 1854

AL

W&D 2473

corporate features which allow the belt booster to be locked in any position.

Check No. 13 on Reply Card for more Details

Dock Leveler Cuts Loading Time

Transfer of loads between truck and dock is speeded by dock leveling mechanisms of the type developed by Rowe Methods Inc., 1743 E. 25th St., Cleveland 14, O. Truck loading time and man hours for drivers and dock workers are reduced and dock capacity is increased without additional space with the use of the unit.

Called Adjusta-Dock, the platform leveling device is easily installed in existing docks. Pushbutton control of the hydraulic ram quickly brings the loading platform level with the truck floor.

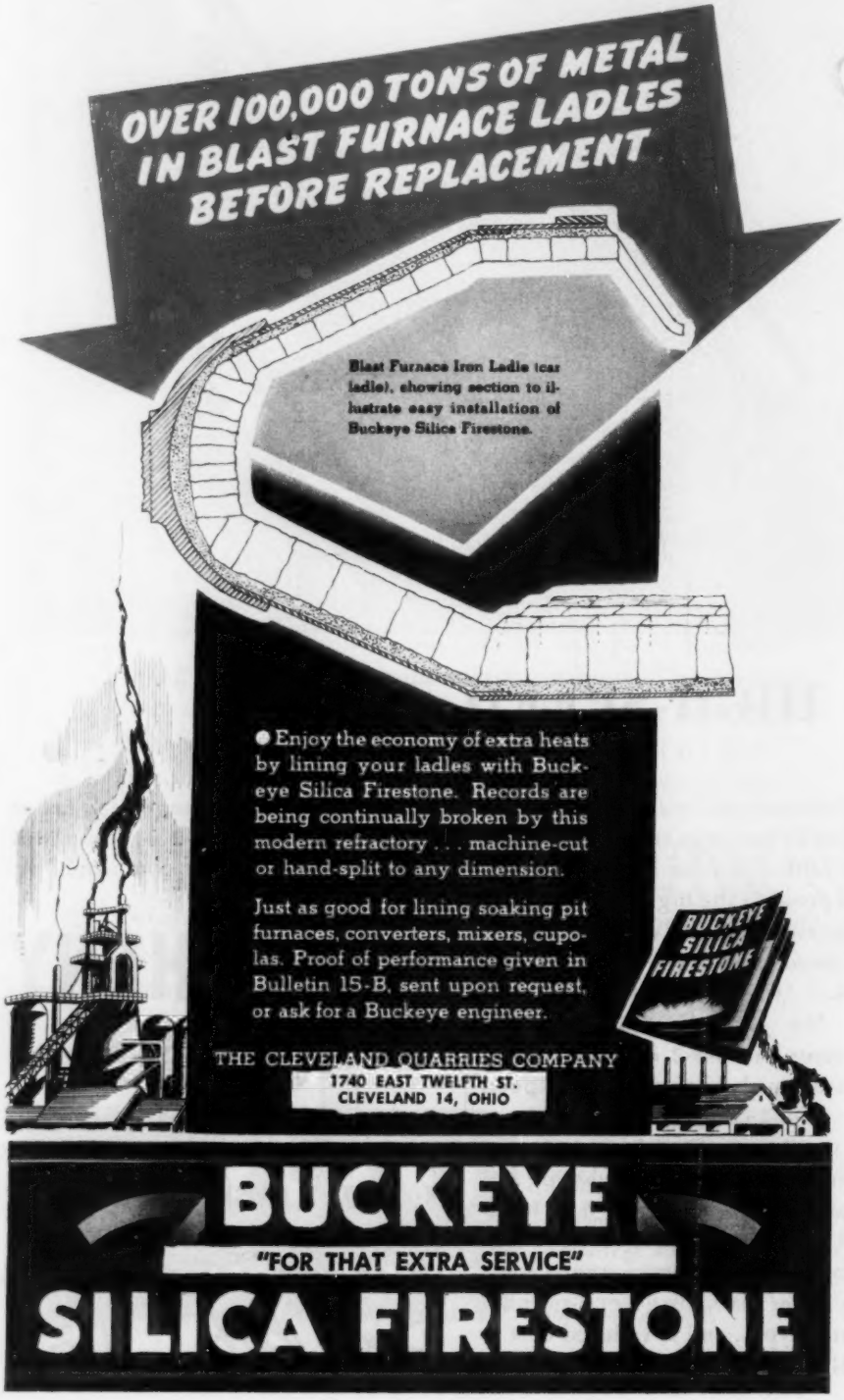
Check No. 14 on Reply Card for more Details

For Small Hole Tapping

Reduced tap breakage and increased tap life are the result of the guided accuracy of the model HT 250 hand tapper offered by H. D. Herder Tool Specialties Co., 2424 Brook Drive, Kalamazoo, Mich. A bench type machine, designed for tool and die shops, experimental departments and light assembly production plants, it has four collets which handle standard tap shank sizes and taps from 0 through ¼-inch.

Collets provide positive drive-through due to square socket and shank design. A knurled threaded collar, removable by hand, holds and centralizes collet and tap. Either right or left hand taps may be used. The adjustable spindle arm swings to right or left and is quickly positioned for height. Maximum distance from machine base to bottom of tap is 6 inches.

Check No. 15 on Reply Card for more Details


OVER 100,000 TONS OF METAL IN BLAST FURNACE LADLES BEFORE REPLACEMENT
Blast Furnace Iron Ladle (car ladle), showing section to illustrate easy installation of Buckeye Silica Firestone.
● Enjoy the economy of extra heats by lining your ladles with Buckeye Silica Firestone. Records are being continually broken by this modern refractory . . . machine-cut or hand-split to any dimension.
Just as good for lining soaking pit furnaces, converters, mixers, cupolas. Proof of performance given in Bulletin 15-B, sent upon request, or ask for a Buckeye engineer.
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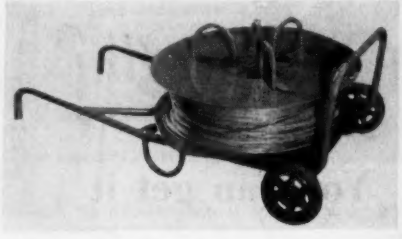
Truck Carries Strapping Coil

Heavy gages of round steel strapping coils up to 150 pounds each may be carried on an easily maneuvered hand truck, developed by Gerrard Steel Strapping Co., 2915 W. 47th St., Chicago 32, Ill. Strapping is usable from either a horizontal or vertical position and may be unreeled either clockwise or counter-clockwise. Weight of truck without strapping coil is 150 pounds. It is of light tubular all-welded steel construction and has a 4 to 1 lifting ratio.

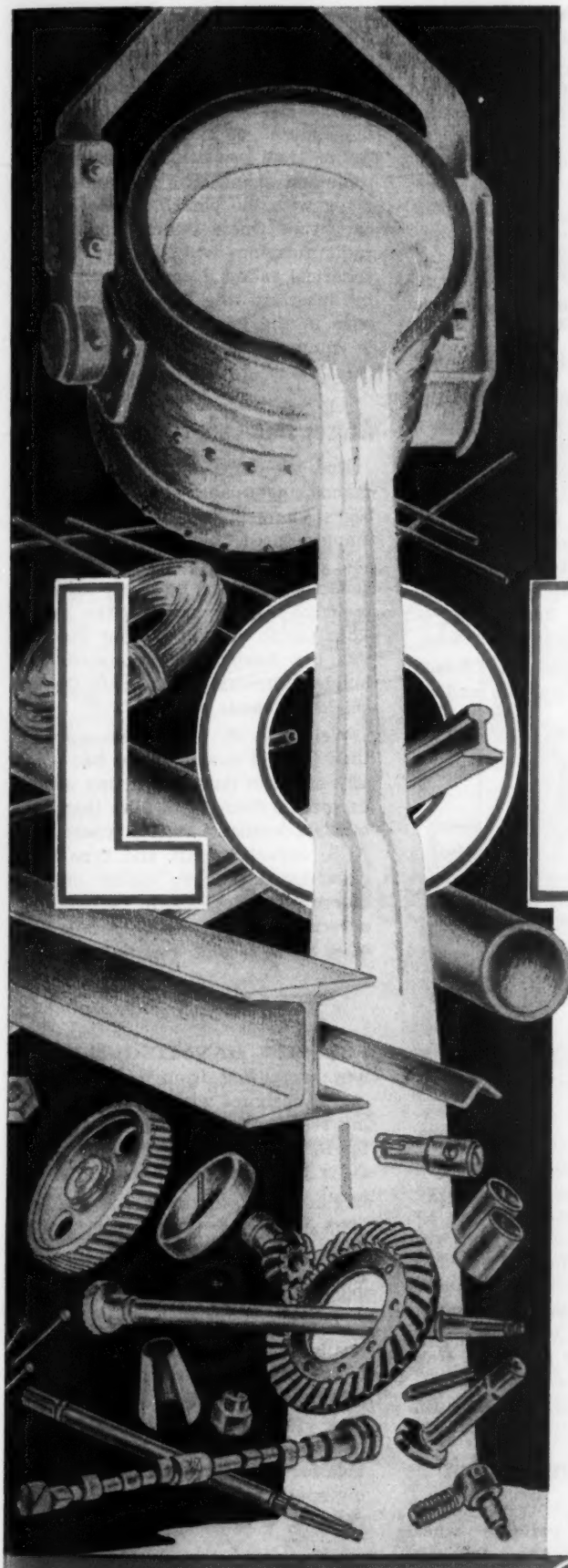


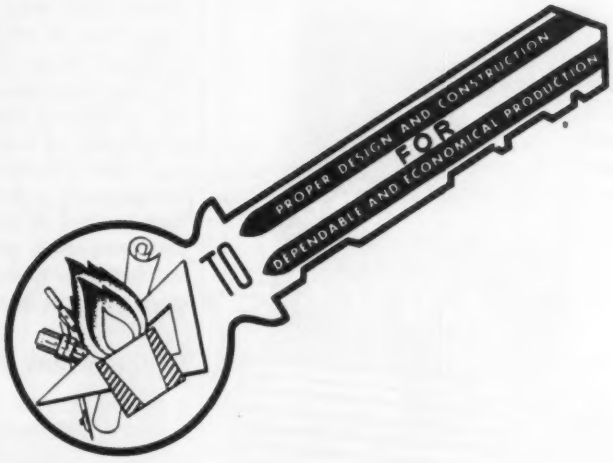
Loading is accomplished by placing the coil on the outside of three inverted U-shaped tubes. A flat circular sheet cover with slots to clear the inverted U-shaped guides is placed over the coil to hold it in place. By turning the locking device slightly to right or left and depressing the locking arm, cover is locked over the coil. This device holds the coil in place as it diminishes in size.

Check No. 16 on Reply Card for more Details

Small Lot Production Furnace

For operation to 1850° F is a bench type heat treating furnace with chamber dimensions of 8 x 10 x 18 inches, built by Cooley Electric Mfg. Corp., 38 S. Shelby St., Indianapolis, Ind. Model VK-48 is equipped with a selective power modifier for manual setting of power input at any point from 5 to 100 per cent of full rat-





LOFTUS

Loftus Designs and Engineers Complete Plants and Individual Furnaces for the ferrous or non-ferrous industries - From the Open Hearth to the Heating Furnaces for the final rolling - Then from the metal stock to the Heat Treating Line. The Loftus organization serves the metallurgical field from melting and refining to the finished heat-treated product.

610 SMITHFIELD ST. **LOFTUS ENGINEERING** *corporation* PITTSBURGH, PA.

Designers and Builders — Engineers, Consultants, Contractors

ing. Operating with a control pyrometer, both high and low temperatures may be held at close limits.

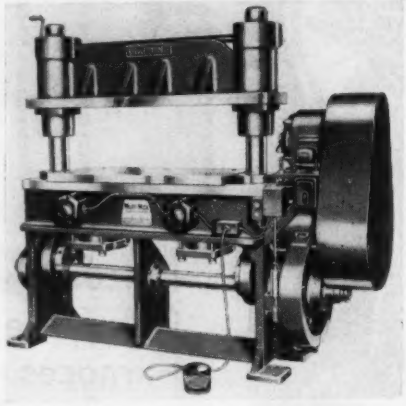
Model VH-48 is designed for controlling pyrometer operation but without auxiliary control equipment. It is adapted to hardening and tempering where uniformity at the lower temperature is not too critical. Either may be used in tool and die hardening and tempering and as a furnace for batch production runs of small parts.

Check No. 17 on Reply Card for more Details

Double Crank Punch Press

Rated at 30 tons capacity, the model 3036 Multi-Max punch press, made by Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif., combines a bolster area of 16 x 36 inches and a ram area of 10 x 36 inches. Combination of press speed and large bolster area makes possible a wide variety of metal stamping operations. Press speed is 80 strokes per minute.

Illustrated press has two 8-inch pneumatic draw die cushions and an



electrically operated solenoid clutch mechanism with hand operated dual pushbutton safety switches and remote control foot switch. Presses are of all steel welded construction with 4-point engaging clutch. Standard stroke is 2 inches and maximum stroke to order is 4 inches. Standard shut die height is 10 inches with maximum to order of 24 inches. Ram adjustment is 2 inches.

Check No. 18 on Reply Card for more Details

Portable Wheel Crusher Unit

Grinding wheels may be crush formed with the portable wheel crusher unit developed by Jerpbak-Bayless Co. Inc., Chagrin Falls, O. Base of the unit is square on the sides and parallel with the roll arbor for quick alignment on any type of surface or cylindrical grinder. Arbor is mounted on heavy duty precision timken roller bearings.

Wheel crusher roll is removed from spindle by removing one locking nut. Standard unit can be used to form grinding wheels up to 1¼ inches wide. Wider wheels can be formed by the addition of a longer roll spindle. A universal crusher roll for various radii and shapes has been developed along with the portable wheel crusher fixture. One 1¼-inch wide roll for radii forming will develop a half spherical radius from 0.001 to 0.0625 by inserting the correct dimension wire in the groove of the roll. Unit is equipped with a ⅛-hp motor.

Check No. 19 on Reply Card for more Details

Motor Has Capacitor Base

For use where power supply demands single-phase operation is an integral horsepower capacitor motor manufactured by General Electric Co., Schenectady 5, N. Y. Of cast iron construction, it has a capacitor mounted in the base of the motor. There is no conduit box on the side, this box having been replaced by a build-in terminal board inside the end shield for easier wiring.

Weighing 15 to 20 per cent less than the old model, motor has a totally enclosed built-in starting switch. In ratings from ½ to 5 hp these motors are available in two types: Type KCS, capacitor-start and type KCR, capacitor-run. They differ only in starting current, not in output characteristics.

Check No. 20 on Reply Card for more Details

• • •

FOR SAFE HANDLING: E-Z Up, a new barrel and drum tool for upending, is designed with a tension clinching feature for positive safety. Made by D. S. Campbell Co., Cleveland 3, O., it has no moving parts to slip or break.

Check No. 21 on Reply Card for more Details

PRELUBRICATED BEARINGS: Type SK direct current Life-Line motors in 1 to 30 hp ratings are available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Prelubricated sealed-for-life ball bearings provide effective lubrication without attention. Motors are available for constant, adjustable or varying speed applications.

Check No. 22 on Reply Card for more Details

IMPROVES COMBUSTION CONTROL: Addition of new sizes to its line of Pacific-Wing induced draft fans, is announced by Pacific Steel Boiler Division, United States Radiator Corp., Detroit 26, Mich. Units improve combustion control, permit

It's a Bigger, Better Bonus when you give it in Bonds

It's a *bigger* bonus when you give it in U. S. Savings Bonds. That's because Savings Bonds pay $4 at maturity for every $3 purchased. If it's a $75 bonus, for example, and you give the bonus in bonds, the employee receives—not a $75 Bond—but a *$100* Bond. And he *collects* $100 if he holds the Bond till maturity.

It's a *better* bonus when you give it in Bonds. It encourages saving among your employees—helps to make them more secure, more stable, more contented and productive on the job. (That's borne out in the more than 20,000 companies that make Bonds available to employes through the Payroll Savings Plan!) Another reason is that the more Bonds people hold today, the greater will be tomorrow's purchasing power—without which no business can prosper! Then again, Savings Bond sales aid the nation's economic security by spreading the national debt.

Thus you help your employees, your company, and the good old U. S. A. itself—which means *yourself*!—when you give the bonus in Savings Bonds . . . and when you push the Payroll Savings Plan. All the facts and assistance you need are available from your State Director, Savings Bonds Division, U. S. Treasury Department. He's listed in your phone book. Why not ask your secretary to get him for you right now?

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

addition of boilers in an installation where existing stack would prove inadequate, permit advantageous location of boiler room on rooftop or elsewhere.

Check No. 23 on Reply Card for more Details

FOR QUICK CLEANING: Tornado portable vacuum cleaner, made by Breuer Electric Mfg. Co., Chicago 40, Ill., has a strong, steady, powerful suction which makes it suitable for quick, thorough cleaning in close, confined places. It is made in four sizes equipped with 1/3, 3/5, 1 and 1 1/3 hp motors.

Check No. 24 on Reply Card for more Details

PRINTS AND DEVELOPS: C. F. Pease Co., Chicago, Ill., announces a new whiteprinting machine, the Pacemaker. It is an automatic reproduction machine designed for printing and developing ammonia vapor white prints continuously, in cut sheets or from rolls, at speeds ranging up to 32 feet per minute. It reproduces tracings, drawing, foil, film or anything typed, written or drawn on reasonably translucent paper.

Check No. 25 on Reply Card for more Details

FOR SIZING, FINISHING HOLES: Honall, a new portable honing tool for sizing and finishing holes is offered by Sunnen Products Co., St. Louis 17, Mo., for use with portable drill, lathe or drill press. Recommended for generating round, straight holes with accuracy as desired and with surface finish as fine as 2 microinches root mean square in hardened steel, it covers a range from 3/15 to 1-inch in all metals (except lead and babbitt), ceramics and glass.

Check No. 26 on Reply Card for more Details

SMOTHERS FIRE: Industrial Products Co., Philadelphia 33, Pa., announces a new roller type fire blanket for use in locations where the hazard of clothing catching fire is present. It allows a man to envolope his body in a few seconds, cutting off the air and smothering the fire.

Check No. 27 on Reply Card for more Details

HANDLES HEAVY LOADS: Heavy loads at high speeds can be handled with extreme accuracy in lathes and other machines by using the new live centers made by Scully-Jones & Co., Chicago 8, Ill. They are available in Nos. 2, 3, 4 and 5 Morse taper sizes.

Check No. 28 on Reply Card for more Details

ELIMINATES SLIPPERY FLOORS: A new nonskid, nonslip safety tread flooring material called Perma-Tread, is announced by Mold-Cast Alloy Corp., Indianapolis, Ind. It is a heavy gage, cast aluminum plate which has a fine silica-carbide grit material distributed through the casting and permanently bonded into its surface. Available in sizes up to 6 feet continuous length and 1 foot width and in thicknesses of 1/4, 5/16 and 3/8-inch.

Check No. 29 on Reply Card for more Details

CUTS PRIMING TIME: Model 40 series R self-priming Durcopump, announced by Duriron Co. Inc., New York 17, N. Y., is available in 12 Durco corrosion resisting alloys. It features conversion of wet end parts from one alloy to another without changing working dimensions or the power end. Unit is made in two sizes.

Check No. 30 on Reply Card for more Details

REMOVES STUDS: No. S-60B stud remover, developed by J. H. Williams & Co., Buffalo 7, N. Y., is designed for use with ½-inch square drive handles and attachments. An eccentrically mounted roller with deep milled edge provides a nonslipping gripping surface which is nonburring. Stud capacity is $\frac{5}{16}$-inch to $\frac{3}{4}$-inch diameter.

Check No. 31 on Reply Card for more Details

DETERMINES TEMPERATURES: Pyrometer Instrument Co. Inc., Bergenfield, N. J., offers a new instrument to determine surface and subsurface temperatures. It features a large 4-inch direct reading indicator mounted in a rubber cushioned housing. Two series of models are available, each in four temperature ranges from 0-400° F to 0-1200° F and all thermocouples may be interchanged without adjustment or recalibration.

Check No. 32 on Reply Card for more Details

TAKES ROLLER CHAIN APART: Baldwin-Duckworth division of Chain Belt Co., Milwaukee 4, Wis., introduces Baldwin-Rex chain vises which simplify the job of taking roller chain apart. Single or double width chain can be securely clamped in vise while an ordinary drift is used to drive out pin or rivet.

Check No. 33 on Reply Card for more Details

MAGNETIC STARTERS: A line of alternating current magnetic starters designed to conform to NEMA standards for industrial control is announced by Square D Co., Milwaukee 12, Wis. Sizes 0, 1 and 2 open-type contactors and starters are made with standardized mounting dimensions. Holding circuit interlocks are located to left of vertical centerline. Other design features on size 0 up through size 3 include straight-line guided motion of armature and movable contact assembly.

Check No. 34 on Reply Card for more Details

FOR SMOOTH STOPPING: Designed for mounting to a standard NEMA C flange, is the new disk type electric brake made by Warner Electric Brake Co., Beloit, Wis. It is a combination magnetic and friction type, electrically operated and developed to give easily controlled, fast, smooth cushioned stops. It needs 25-35 w dc for full application.

Check No. 35 on Reply Card for more Details

FREE OF CHIPS, DIRT: An improved Low-Boy machinists' vise, offered by Parma Mfg Co., Parma, Mich., is built without T-slots and bolt holes, thus inside of the vise is kept free of chips and dirt. A new lock-plate for the swivel permits a locking area of 360 degrees, clamps the vise more rigidly with less pressure. Unit made in two sizes.

Check No. 36 on Reply Card for more Details

FOR ACCURATE SETTING: A micrometer stop and lathe carriage spacer combined, is the new time-saving tool offered by Ellwood Products Co., Detroit 2, Mich. It permits faster, more accurate setting for boring holes to greater depth, accurately spacing shoulders, grooves and undercuts on all turning jobs. Tool fits all makes and size tool room lathes.

Check No. 37 on Reply Card for more Details

COPPER BALL ANODES: A new forged copper ball anode is announced by Udylite Corp., Detroit, Mich. These anodes have a fine grain and are very clean in the plating bath.

Check No. 38 on Reply Card for more Details

SERVES AS A CLAMP: Designated as MagnaGround, a permanent Alnico magnet designed to serve as a clamp for ground cable of electric welders is announced by Dings Magnetic Separator Co., Milwaukee 14, Wis. Taking up to 600 amp, it is attached to the cable with set screws or silver soldering and can be applied on any magnetic surface.

Check No. 39 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

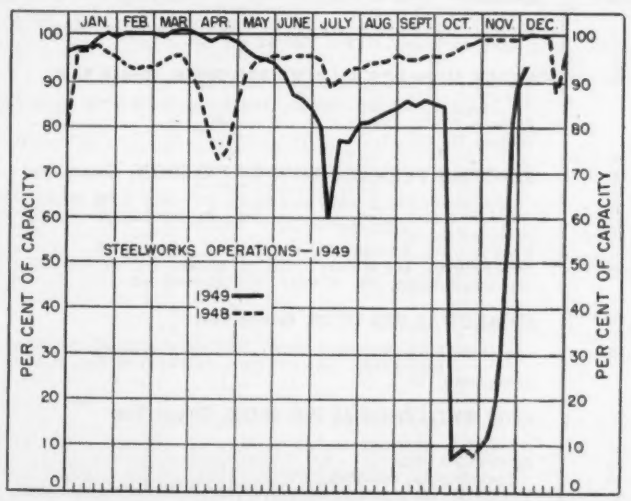
STRONG price undertone prevails in the steel markets. Additional isolated increases were effected last week. More are in the offing. Recent upward adjustments have been entirely by the smaller producers. But the major interests currently are going over their product schedules, and with costs mounting, important increases loom. These probably will become effective around the turn of the year. No sweeping advance is imminent. An across-the-board increase seems out, and the steelmakers will concentrate on those product prices substantially out of line with costs.

PRICES—Over the past month or so at least ten small steelmakers have effected increases. These range from $5 per ton on narrow hot strip to $35 on silicon sheets. Last week a narrow strip producer upped its price $5 per ton, this action following that of one other interest two weeks preceding. Still another maker raised hot-rolled sheets, enameling and silicon sheets $10 per ton. Two wire sellers stepped up prices $10 per ton on a few grades and two makers advanced galvanized sheets. Semi-finished steel was hiked $5 per ton by one producer and another is planning similar action. Tin plate contract price for 1950 is expected momentarily. Whether this will be up or down is problematical in view of the sharp decline in pig tin prices since the beginning of November. In general, trade observers think upward revisions in extras, especially on the light, flat-rolled products, will precede any broad change in base prices by the major companies. Meanwhile, uncertainty as to demand beyond first quarter is contributing a restraining influence in determining price policy. Competitive conditions and consumer resistance are expected to exert considerable bearing on ultimate decisions.

COMPOSITES—Scrap prices continue to slip in the absence of consumer buying. STEEL's composite on steelmaking grades declined last week to $28.75 from $29.17 the week preceding. A year ago this index stood at $43.25. The weighted index for finished steel is unchanged at 152.52 despite scattered advances effected recently by a number of small producers. A year ago this index figure was 151.86. The arithmetical composite on finished steel also is unchanged at $91.64 and compares with $95.50 last year. Pig iron composities are steady as follows: Basic, $45.60; No. 2 foundry, $46.10; malleable, $47.27.

DEMAND—Metalworking shops appeared to be showing a little more interest in the heavier products last week. Demand, however, lacked the pressure that marks specifications for sheets, strip and pipe. Among products in somewhat stronger demand are carbon bars, structural shapes and plates. Deliveries in all three items are a shade more extended than immediately after the steel strike though still generally available for fairly early shipment. Inquiry for pipe and the light, flat-rolled products is stronger than ever, in the latter items the mills being booked through first quarter; in some instances through first half. Some orders for sheets have been returned to customers because of the sold-out condition of certain sellers. The mills will enter first quarter, 1950, with substantial bookings of all products, but pipe and flat-rolled will dominate volume. Producers are uncertain of demand volume in second quarter. A note of uneasiness is evident in appraisals of the outlook after March. Much depends on developments in the automotive industry which has been the main consuming support of the steel market for months past.

PRODUCTION—Steelmaking operations, fully recovered from the steel strike, last week advanced another 3½ points to 93 per cent of capacity. This is the highest ingot rate attained since May.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Dec. 10	Change	Same Week 1948	Same Week 1947
Pittsburgh	91	+ 3*	96.5	102
Chicago	94	+ 1.5*	99	95.5
Eastern Pa.	83	+ 1	97	93.5
Youngstown	95	None	105	102
Wheeling	99	None	97.5	93.5
Cleveland	98†	— 5.5	99.5	91.5
Buffalo	103½	+ 2.5	104	88.5
Birmingham	100	None	100	102
New England	89	None	89	85
Cincinnati	101	+31	99	85
St. Louis	91.5	+ 7	91.5	89.5
Detroit	101	None	100	92
Western	89	+ 7	..	..
Estimated national rate	93	+ 3.5	100	97.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. * Change from revised rate. † Based on revised capacity.

Composite Market Averages

	Dec. 8 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$91.64	$91.64	$91.64	$95.50	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	28.58	29.17	28.00	43.25	18.92

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 8 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh ...	3.35	3.35	3.35	3.35–55	2.15
Bars, H.R., del. Phila. ...	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh ...	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C. F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40–60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa. ..	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh ..	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh ..	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25–70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh...	4.00	4.00	4.00	4.00–75	2.80
Strip, C.R., Chicago	4.00–15	4.00–15	4.00–15	4.00–25	2.90
Strip, C.R., Detroit	4.20–25	4.20–25	4.20–25	4.20–50	2.90
Wire, Basic, Pittsburgh ...	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh ...	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh.	$7.75	$7.75	$7.75	$6.80	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–57.00	51.78–57.00	51.78–52.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{7}{16}$", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham ..	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts. ..	$32.00	$32.00	$29.50	$42.75	$20.00
No. 1 Heavy Melt. E. Pa. .	24.75	26.00	25.00	45.25	18.00
No. 1 Heavy Melt. Chicago	29.00	29.50	29.50	41.75	18.75
No. 1 Heavy Melt. Valley:.	32.75	32.75	32.75	42.75	18.25
No. 1 Heavy Melt. Cleve...	30.25	30.25	30.25	42.25	18.25
No. 1 Heavy Melt. Buffalo.	29.75	29.75	28.25	48.50	19.25
Rails, Rerolling, Chicago..	43.50	44.50	44.50	71.50	22.25
No. 1 Cast, Chicago.....	42.50	42.50	42.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl. .	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.75	15.75	15.75	17.00	7.75
Oven Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	23.50	12.00
Zinc, E. St. Louis	9.75	9.75	9.75	17.50	8.25
Lead, St. Louis	11.80	11.80	12.55	21.30–35	6.35
Tin, New York.....	79.00	85.00	94.50	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	32.00	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Cincinnati,del.	....	46.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb, piglets, frt. allowed K2..	82.00
Wenatchee,Wash, OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Dec. 8, 1949; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7 .....$50.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)

Detroit R7 .....$51.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ...51.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. C3 .....$52.00
Clairton,Pa. C3 .....52.00
Conshohocken,Pa. A3 ..57.00
Ensley,Ala. T2 .....52.00
Fairfield,Ala. T2 .....52.00
Fontana,Calif. K1 .....71.00
Gary,Ind. C3 .....52.00
Johnstown,Pa. B2 .....52.00
Lackawanna,N.Y. B2 ..52.00
Munhall,Pa. C3 .....52.00
Sharon,Pa. S3 .....57.00
So.Chicago,Ill. C3 .....52.00
So.Duquesne,Pa. C3 ...52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 .....$61.00
Buffalo R2 .....61.00
Canton,O. R2 .....61.00
Clairton,Pa. C3 .....61.00
Cleveland R2 .....61.00
Conshohocken,Pa. A3 ..63.00
Detroit R7 .....61.00
Ensley,Ala. T2 .....61.00
Fairfield,Ala. T2 .....61.00
Fontana,Calif. K1 .....80.00
Gary,Ind. C3 .....61.00
Geneva,Utah G1 .....61.00
Houston,Tex. S5 .....69.00
Ind. Harbor,Ind. I-2 ...61.00
Johnstown,Pa. B2 .....61.00
Lackawanna,N.Y. B2 ..61.00
Munhall,Pa. C3 .....61.00
So.Duquesne,Pa. C3 ...61.00
So.Chicago,Ill. C3, R2..61.00
Warren,O. C17 .....61.00

Alloy (NT)

Bethlehem,Pa. B2 ....$63.00
Buffalo R2 .....63.00
Canton,O. R2, T7.....63.00
Conshohocken,Pa. A3 ..65.00
Detroit R7 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Houston,Tex. S5 .....71.00
Johnstown,Pa. B2 .....63.00
Lackawanna,N.Y. B2 ..63.00
Massillon,O. R2 .....63.00
Midland,Pa. C18 .....63.00
Munhall,Pa. C3 .....63.00
Sharon,Pa. S3 .....63.00
So.Chicago,Ill. C3, R2..63.00
So.Duquesne,Pa. C3 ...63.00
Warren,O. C17 .....63.00

SHEET BARS (NT)

Mansfield,O. E6..(GT)$58.00
Portsmouth,O. P12 ....52.00
Sharon,Pa. S3 .....57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00

SKELP

Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.25
Warren,O. R2 .....3.25
Youngstown C3, R2 ....3.25

WIRE RODS

AlabamaCity,Ala. R2 ..3.40
Buffalo W12 .....3.40
Cleveland A7 .....3.40
Donora,Pa. A7 .....3.40
Fairfield,Ala. T2 .....3.40
Houston,Tex. S5 .....3.95
Ind.Harbor,Ind. Y1 ....3.40
Johnstown,Pa. B2 .....3.40
Joliet,Ill. A7 .....3.40
Los Angeles B3 .....4.20
Monessen,Pa. P7 .....3.40
Pittsburg,Calif. C11 ....4.05
Portsmouth,O. P12 ....3.40
So. Chicago,Ill. R2.....3.40
SparrowsPoint B2 .....3.50
Sterling,Ill.(1) N15 .....3.40
Struthers,O. Y1 .....3.40
Torrance,Calif. C11 ....4.20
Worcester,Mass. A7 ....3.70

STRUCTURALS Wide Flange

Bethlehem,Pa. B2 .....3.30
Lackawanna,N.Y. B2 ...3.30
Munhall,Pa. C3 .....3.20
So.Chicago,Ill. C3 .....3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 .....4.95
Bessemer,Ala. T2 .....4.95
Bethlehem,Pa.(14) B2 ..5.05
Clairton,Pa. C3 .....4.95
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.10
Gary, Ind. C3 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.95
Johnstown,Pa. B2 .....5.05
Lackawna,N.Y.(14) B2 .5.05
Munhall,Pa.(14) C3 ....4.95
So.Chicago,Ill.(14) C3 ..4.95
Struthers,O. Y1 .....4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 .....3.25
Bessemer,Ala. T2 .....3.25
Bethlehem,Pa. B2 .....3.30
Clairton,Pa. C3 .....3.25
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....3.80
Gary,Ind. C3 .....3.25
Geneva,Utah G1 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2 ....3.25
Johnstown,Pa. B2 .....3.30
KansasCity,Mo. S5 .....3.85
Lackawanna,N.Y. B2 ...3.30
LosAngeles B3 .....3.85
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.25
Niles,Calif.(22) P1 .....3.97
Phoenixville,Pa. P4 .....3.30
Portland,Oreg. O4 .....3.90
Seattle B3 .....3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 ....3.80
Torrance,Calif. C11 ....3.85
Weirton,W.Va. W6 ....3.25

Alloy Stand. Shapes

Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 ....4.05
Lackawanna,N.Y. B2 ...4.05
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
Weirton,W.Va. W6 .....4.05

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Ashland,Ky.(15) A10 ...3.40
Bessemer,Ala. T2 .....3.40
Clairton,Pa. C3 .....3.40
Claymont,Del. W16 ....3.50
Cleveland J5, R2 .....3.40
Coatesville,Pa. L7 .....3.50
Conshohocken,Pa. A3 ...3.50
Ecorse,Mich. G5 .....3.65
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Harrisburg,Pa. C5 .....3.75
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2, Y1.3.40
Johnstown,Pa. B2 .....3.40
Lackawanna,N.Y. B2 ...3.40
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.40
Pittsburgh J5 .....3.40
Seattle B3 .....4.30
Sharon, Pa. S3 .....3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 ..3.40
Steubenville,O. W10 ....3.40
Warren,O. R2 .....3.40
Weirton,W.Va. W6 .....3.40
Youngstown C3, Y1 ....3.40

PLATES (Universal Mill)

Fontana,Calif. K1 .....4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ...4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.15
Cleveland,cl R2 .....3.65
Warren,O.,cl R2 .....3.65

PLATES, Wrought Iron

Economy,Pa. B14 .....7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland J5, R2 .....5.20
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.45
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....5.80
Gary,Ind. C3 .....5.20
Geneva,Utah G1 .....5.20
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 .5.20
Johnstown,Pa. B2 .....5.20
Munhall,Pa. C3 .....5.20
Pittsburgh J5 .....5.20
Sharon,Pa. S3 .....5.65
So.Chicago,Ill. C3 .....5.20
SparrowsPoint,Md. B2 ..5.20
Warren,O. R2 .....5.20
Youngstown Y1 .....5.20

FLOOR PLATES

Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ...3.35
Aliquippa,Pa. J5 .....3.35
Alton,Ill.(1) L1 .....3.35
Ashland,Ky. (17) A10...3.35
Atlanta,Ga. A11 .....3.50
Bessemer,Ala. T2 .....3.35
Buffalo R2 .....3.35
Canton,O. R2 .....3.35
Clairton,Pa. C3 .....3.35
Cleveland R2 .....3.35
Ecorse,Mich. G5 .....3.55
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1.3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ...3.35
LosAngeles B3 .....4.05
Marion,O. P11 .....3.35
Midland,Pa. C18 .....3.35
Milton,Pa. B6 .....3.35
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.05
N.Tonawanda,N.Y. B11 .3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.10
S.Chicago C3, R2, W14..3.35
So.Duquesne,Pa. C3 ....3.35
S.SanFran.,Cal. B3 ....4.10
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Weirton,W.Va. W6 .....3.35
Youngstown C3, R2 ....3.35

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....3.35
Atlanta,Ga. A11 .....3.50
Bethlehem,Pa.(2) B2 ...3.55
Johnstown,Pa. B2 .....3.35
Lackawanna,N.Y. B2 ...3.35
Niles,Calif. P1 .....4.05
Pittsburgh(23) J5 .....3.35
Portland,Oreg. O4 .....4.10
SanFrancisco S7 .....4.05
Weirton,W.Va. W6 .....3.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....3.75
Buffalo R2 .....3.75
Canton,O. R2, T7 .....3.75
Clairton,Pa. C3 .....3.75
Ecorse,Mich. G5 .....4.05
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....3.75
Houston,Tex. S5 .....4.15
Ind.Harbor,Ind. I-2, Y1.3.75
Johnstown,Pa. B2 .....3.75
KansasCity,Mo. S5 .....4.35
Lackawanna,N.Y. B2 ...3.75
LosAngeles B3 .....4.80
Massillon,O. R2 .....3.75
Midland,Pa. C18 .....3.75
S.Chicago C3, R2, W14..3.75
So.Duquesne,Pa. C3 ....3.75
Struthers,O. Y1 .....3.75
Warren,O. C17 .....3.75
Youngstown C3 .....3.75

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 .....4.00
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....4.00
Youngstown C3 .....4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.10
Bessemer,Ala. T2 .....5.10
Bethlehem,Pa. B2 .....5.10
Clairton,Pa. C3 .....5.10
Cleveland R2 .....5.10
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.10
Fontana,Calif. K1 .....6.15
Gary,Ind. C3 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ...5.10
Pittsburgh J5 .....5.10
So.Duquesne,Pa. C3 ....5.10
Struthers,O. Y1 .....5.10
Youngstown C3 .....5.10

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 .....4.00
Ambridge,Pa. W18.....4.00
BeaverFalls, M12, R2...4.00
Buffalo B5 .....4.00
Camden,N.J. P13 .....4.48
Carnegie,Pa. C12 .....4.00
Chicago W18 .....4.00
Cleveland A7, C20.....4.00
Cumberland,Md. C19 ...3.95
Detroit P17 .....4.15
Donora,Pa. A7 .....4.00
Ecorse,Mich. G5 .....4.30
Elyria,O. W8 .....4.00
FranklinPark,Ill. N5 ....4.00
Gary,Ind. R2 .....4.00
Hammond,Ind. L2, M13.4.00
Hartford, Conn. R2 ....4.40
Harvey,Ill. B5 .....4.00
Indianapolis M13 .....4.20
LosAngeles R2 .....5.40
Mansfield,Mass. B5 ....4.40
Massillon,O. R2, R8....4.00
Midland,Pa. C18 .....4.00
Monaca,Pa. S17 .....4.00
Newark,N.J. W18 .....4.40
Plymouth,Mich. P5 .....4.25
Pittsburgh J5 .....3.95
Putnam,Conn. W18 ....4.40
Readville,Mass. C14 ...4.40
St.Louis,Mo. M5 .....4.35
So.Chicago,Ill. W14 ....4.00
SpringCity,Pa.(5) K3 ..4.48
Struthers,O. Y1 .....4.00
Waukegan,Ill. A7 .....4.00
Youngstown F3, Y1,....4.00

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 .....4.65
Ambridge,Pa. W18 .....4.65
BeaverFalls,Pa. M12....4.65
Bethlehem,Pa. B2 .....4.65
Buffalo B5 .....4.65
Canton,O. R2, T7.....4.65
Carnegie,Pa. C12 .....4.65
Chicago W18 .....4.65
Cleveland A7, C20.....4.65
Detroit P17 .....4.80
Donora,Pa. A7 .....4.65
Elyria,O. W8 .....4.65
Gary,Ind. R2 .....4.65
Hammond,Ind. L2, M13.4.65
Hartford,Conn. R2 .....4.95
Harvey,Ill. B5 .....4.65
Indianapolis M13 .....4.85
Lackawanna,N.Y. B2 ..4.65
Mansfield,Mass. B5 .....4.95
Massillon,O. R2, R8.....4.65
Midland,Pa. C18 .....4.65
Monaca,Pa. S17 .....4.65
Newark,N.J. W18 .....4.95
So.Chicago,Ill. R2, W14.4.65
Struthers,O. Y1 .....4.65
Waukegan,Ill. A7 .....4.65
Worcester,Mass. A7 ....4.95
Youngstown F3, Y1 ....4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ...3.35
Alton,Ill.(6) L1 .....3.35
Atlanta,Ga. A11 .....3.50
Buffalo R2 .....3.35
Cleveland R2 .....3.35
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1 .3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.05
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle,Wash. B3, N14..4.10
So.Chicago,Ill. R2 .....3.35
So.Duquesne,Pa. C3 ....3.35
So.SanFrancisco B3 ....4.10
SparrowsPoint,Md. B2 ..3.35
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Youngstown C3, R2 ....3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ...4.25
LosAngeles B3 .....5.00
Marion,O. P11 .....4.25
Pittsburgh J5 .....4.25
Seattle B3, N14 .....5.00
So.SanFrancisco B3 ....5.00
SparrowsPt.,1⅛-1¼" B2.4.83
SparrowsPt., ¼-1" B2 ..4.25

RAIL STEEL BARS

ChicagoHts.,Ill(3) I-2 ..3.25
FortWorth,Tex.(4) T4 ..4.33
Hntngtn,W.Va.(3) W7 ..3.35
Moline,Ill.(3) R2 .....3.35
Williamsport(2,3) S19 ..3.35
Williamsport(4) S19 ....3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14..9.50
Economy,Pa.(D.R.)B14.11.00
Economy(Stablt) B14 ..11.30
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10 ...3.60

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 ..3.25
Ashland,Ky.(8) A10 ....3.25
Butler,Pa. A10 .....3.25
Cleveland J5, R2 .....3.25
Conshohocken,Pa. A3 ...3.35
Ecorse,Mich.(8) G5 ....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....4.15
Gary,Ind. C3 .....3.25
Ind.Harbor,Ind. I-2, Y1..3.25
Irvin,Pa. C3 .....3.25
Kokomo,Ind. C16 .....3.35
Lackawanna,N.Y. B2 ...3.25
Munhall,Pa. C3 .....3.25
Niles,O. M4 .....3.75
Pittsburg,Calif. C11 ....3.95
Pittsburgh J5 .....3.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
SparrowsPoint,Md. B2 ..3.25
Steubenville,O. W10 ....3.25
Torrance,Calif. C11 ....3.95
Warren,O. R2 .....3.25
Weirton,W.Va. W6 .....3.25
Youngstown C3, Y1 ....3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 ...4.40
Dover,O. R1 .....5.00
Fairfield,Ala. T2 .....4.15
Ind.Harbor,Ind. I-2 ....4.15
Kokomo,Ind. C16 .....4.25
Mansfield,O. E6 .....4.15
Niles,O. N12 .....4.15
Niles,O. M4 .....4.65
Torrance,Calif. C11 ....5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.00
Cleveland J5, R2 .....4.00
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.00
Follansbee,W.Va. F4 ...4.00
Fontana,Calif. K1 .....4.90
Gary,Ind. C3 .....4.00
GraniteCity,Ill. G4 .....4.20
Ind.Harbor,Ind. I-2, Y1.4.00
Irvin,Pa. C3 .....4.00
Lackawanna,N.Y. B2 ...4.00
Middletown,O. A10 ....4.00
Pittsburg,Calif. C11 ....4.95
Pittsburgh J5 .....4.00
SparrowsPoint,Md. B2 ..4.00
Steubenville,O. W10 ....4.00
Warren,O. R2 .....4.00
Weirton,W.Va. W6 .....4.00
Youngstown Y1 .....4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 .....6.95
Gary,Ind. C3 .....6.05
Ind.Harbor,Ind. I-2, Y1.6.05
Irvin,Pa. C3 .....6.05
Lackawanna,N.Y. B2 ..6.05
Pittsburgh J5 .....6.05
Sharon,Pa. S3 .....6.05
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 .....6.05
Youngstown Y1 .....6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3 Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	5.65
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.80
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu Fe
Ashland A10	5.00	...
Canton,O. R2	5.05	5.50
Fairfield,Ala. T-2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	...	7.70	8.45	9.25
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	*5.65*	*5.95*	*6.45*	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	...	7.70	8.45	9.25
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	9.80	10.35	11.05	11.85
Toronto,O. F4	9.80	10.35	11.05	11.85
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, ZINCGRIP No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	*4.90*
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill. G4	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa.(9) S18	*3.50*
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa.(25) S3	3.25
Sharon,Pa.(9) S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3 Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Carbon

Berea,O. C7	6.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit, D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I-2	4.00
Lackawanna,N.Y. B2	4.00
LosAngeles C1	5.00
Mattapan,Mass.(21) T6	4.50
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
NewCastle,Pa. B4, E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
Riverdale,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.05
Dover,O. G6	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.00
Youngstown C8	4.00

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.40-0.60C	0.60-0.80C	0.80-1.05C	1.05-1.35C
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewCastle,Pa. E5	4.00	5.50	6.10	8.05	10.35
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	6.30	6.90	8.85	11.15
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass. T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold-Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cld.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Col. Steel & Shafting Co.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Co.
D4 Disston & Sons,Henry
D6 Driver Harris Co.

E1 Eastrn.Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Co.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.
H6 Hind Steel Co. Inc.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Cleveland J5	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, Cold-Rolled Flat

Chicago T6	5.35
Cleveland A7	5.00
Dover,O. G6	5.00
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.00
Massillon,O. R8	5.00
Monessen,Pa. P7	5.00
Pawtucket,R.I.(11) N8	5.55
Pawtucket,R.I.(12) N8	5.50
Trenton,N.J. R5	5.80
Worcester,Mass. A7	5.30
Worcester,Mass. T6	5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4	7.70
Buffalo W12	7.70
Chicago W13	7.70
Cleveland A7	7.70
Fostoria,O. S1	8.20
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	7.70
Palmer,Mass. W12	8.00
Portsmouth,O. P12	7.70
Struthers,O. Y1	7.70
Trenton,N.J. R5	8.50
Waukegan,Ill. A7	7.70
Worcester,Mass. A7, T6	8.00

WIRE (16 gage)	An'ld. Galv. Stone	Galv. Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4	9.05	10.55
Cleveland A7	9.05	10.55
Fostoria,O. S1	9.65	11.15
Johnstown B2	9.05	10.55
Kokomo C16	9.05	10.10
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	9.40	10.90
Prtsmth.(18) P12	9.05	10.55
SparrowsPt. B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill.(1) L1	4.15
Bartonville,Ill.(1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Fostoria,O.(24) S1	4.65
Houston S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Minnequa,Colo. C10	4.50
Monessen,Pa. P7	4.15
Newark,6-8ga. I-1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill.(1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7, T6	4.45

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Bartonville,Ill.(19) K4	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Fostoria,O. S1	6.05
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Milbury,Mass.(12) N6	5.85
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7	5.85
Trenton,N.J. R5	6.35
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Buffalo W12	7.50	7.80	8.20
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	8.00	8.30	8.70
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Palmer,Mass. W12	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	8.00	8.30	8.70
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.50	7.80	8.20

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.,City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Buffalo W12	4.80	...
Cleveland A7	4.80	5.25
Crawfrdvll, M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Palmer,Mass W12	5.10	...
Pitts.,Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1) N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill.(1) L1	5.20
Buffalo W12	5.20
Cleveland A7	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
Monessen P7	5.20
NewHaven,Conn. A7	5.50
Palmer,Mass. W12	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

FENCE POSTS

	Col.
Duluth A7	112
Huntington,W.Va. W7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19	n.t.$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2	175
AlabamaCity,Ala. R2	109
Aliquip.,Pa.9-14½ga. J5	109
Atlanta A11	111
Bartonville,Ill.(19) K4	109
Crawfordsvll,Ind. M8	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga. 6" B2	183
Johnstn,17ga.4" B2	186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12	109
Rankin,Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	106
Atlanta A11	107
Bartonville,Ill.(19) K4	106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran.,Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Stock To Dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Chicago,Ill. W13	103
Cleveland A9	*109*
Crawfordsville M8	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa,Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Bartonville,Ill.(19) K4	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa,Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I-2	4.05
Lackawanna,N.Y. B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I-2	4.25
Joliet,Ill. C3	4.25
Lackawanna,N.Y. B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I-2, Y1	5.35
Kansas City, Mo. S5	5.60
Lebanon,Pa. B2	5.35
Minnequa,Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Williamsport,Pa. S19	3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S7 Simmonds Co.
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal-Cyclops Steel
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Corp.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn. Sheet & Tube

(1) Chicago Base. (2) Angles. (3) Merchant. (4) Reinforcing. (5) Philadelphia del. (6) Chicago or Birm. Base. (7) To jobbers, 3 cols. lower. (8) 16 gage and heavier. (9) 6" and narrower. (10) Pittsburgh Base. (11) Cleveland & Pittsburgh Base. (12) Worcester, Mass. Base. (13) 3" & wider; over ½" to under 3" 5.50c. (14) Also wide flange beams. (15) ½" and thinner. (16) 40 lb and under. (17) Flats only. (18) To dealers. (19) Chicago & Pittsburgh Base. (20) Deduct 0.25c for untreated. (21) New Haven, Conn. Base. (22) Del. San Fran. Bay area. (23) Angles 1"x1" to 1¼"x1¼" only. (24) Deduct 0.35c for finer than 15 Ga. (25) Wider than 6".

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	28.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ⅛" through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2½	12	23.54	27.70	22.83	26.88
2¾	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10% Both Sides	—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
302	....	....	....	....	19.75	21.50	75.00
304	22.50	26.50	....	....	20.75	22.50	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized. † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long 35
⅝ & ¾ x 6 in., shorter. 37
¾-in. & larger x 6 in., shorter 34
All diameters longer than 6-in. 30
Tire bolts 25
Plow bolts 47
Lag bolts, 6 in., shorter 37
Lag bolts, longer than 6 in. 35

NUTS

Semifinished hexagon	A.S. Light	Reg. & Heavy
⅞-in., smaller	.41 off	....
½-in., smaller	....	38 off
½-in.-1-in.	.39 off	....
⅝-in.-1-in.	....	37 off
1⅛-in.-1½-in.	.37 off	35 off
1⅝-in., larger	.34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller..51 off
⅝, ⅞, & 1 x 6-in. & shorter .....35 off
Headless, ¼-in., larger.31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
7/16-in., under .....48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	84,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.

Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.

Detroit, strip, except Type 309 M1.

Dunkirk, N. Y., bars, wire A4.

Duquesne, Pa., bars C3.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.

McKeesport, Pa., bars; sheets except Type 416, C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.

So. Chicago, Ind., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.

Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c strip 60.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, except Type 309 quoted 51.00 A4.

Youngstown, strip C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 20.00
Toluol, one deg...19.00-23.50
Industrial xylol ..20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe.	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	.65.00-130.00
Aluminum:	
1500-lb lots, freight allowed	29.00
Atomized, 500-lb drums, freight allowed	30.50
Brass, 10-ton lots	.23.25-26.25
Copper:	
Electrolytic	.28.625
Reduced	27.75
Lead	19.25
Manganese:	
Minus 100 mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	.34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Zinc, 10-ton lots	.15.50-18.25
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, 1000 lb and over	2.90
500 to 1000 lb	2.95
less than 500 lb	3.05
98.8%, minus 65 mesh, freight allowed, 1000 lb and over	2.90
less than 1000 lb	3.05
Tin	1.075
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.50
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic, 99% Cr min	3.50

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur. $13.00-13.50
Connellsvll, fdry 15.50-16.00
New River, foundry 18.00
Wise county, foundry..15.35
Wise county, furnace..14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens..$22.00
Everett, Mass., ovens ....
New England, del.‡..22.70
Chicago, ovens 20.00
Chicago, del. .....†21.45
Detroit, del. 23.91
Terre Haute, ovens....20.20
Milwaukee, ovens 20.75
Indianapolis, ovens....19.85
Chicago, del. 23.32
Cincinnati, del. 22.77
Detroit, del. 23.75
Ironton, O., ovens 19.40
Cincinnati, del. 21.63
Painesville, O., ovens..20.90
Buffalo, del. 23.02
Cleveland, del. 22.62
Erie, del. 21.04
Birmingham, ovens 17.70
Philadelphia, ovens 20.45
Swedeland, Pa., ovens.20.40
Portsmouth, O., ovens.19.50
Detroit, ovens 20.65
Detroit, del. *21.70
Buffalo, del. 22.95
Flint, del. 23.00
Pontiac, del. 21.98
Saginaw, del. 23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse).	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[8]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[8]	4.90	5.10	6.55
Milwaukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.08[3]	5.23	5.43	6.88
Milwau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[3]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.05	6.59	...	5.05	5.25	7.74
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.90	...	...	4.90	5.10	...
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco..	6.15[10]	7.50[8]	7.80	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[3]	5.90	6.35	8.10
Seattle-Tacoma.	6.70†‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [3]—1000 to 4999 lb; [4]—450 to 1499 lb; [6]—400 to 1499 lb; [7]—1000 to 1999 lb; [8]—1000 lb and over; [9]—300 to 999 lb; [10]—1500 to 1999 lb; [11]—400 to 3999 lb; [12]—400 lb and over; [13]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.
Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.
Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot:	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	18.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$35.00
48% 3:1	37.50
48% no ratio	28.50-29.00

South African Transvaal

44% no ratio	$19.00-20.00
45% no ratio	19.50-21.00
48% no ratio	27.00-28.00
50% no ratio	28.50-29.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	37.50

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

Manganese Alloys

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(Please turn to page 160)

Straits Tin Prices Drop to 79.00c

RFC lowers its selling price to level 24 cents under that prevailing until late October. International group plans to reinstitute some prewar stabilizing controls

New York—Tin Sales Corp., selling agency for the Reconstruction Finance Corp., reduced its price for grade A tin two cents a pound to 79.00c, New York, effective Dec. 8. The usual differentials will prevail for lower grade tin. The government agency has reduced its price 24 cents a pound from the $1.03 level that prevailed until late October.

Copper prices remain firm at 18.50c, delivered Connecticut, on continued active demand for January metal while lead and zinc are steady on the basis of 11.80c, St. Louis, and 9.75c, East St. Louis, respectively.

Tin—Action of RFC in reducing its selling prices to the 79-cent level has unsettled the London and Singapore markets where the impression is spreading that the RFC intends to compete actively with the British Ministry of Supply on orders for tin for prompt delivery. Offerings of Straits tin for prompt delivery are small in the open market, although sellers of other grade A tin have somewhat better supplies.

Failure of the market to show resistance has induced buyers to act with great caution, say market authorities here.

C. A. Ilgenfritz, United States Steel Corp. official, says that "the drastic drop in prices was caused primarily by the lack of buying interest and the fact that production, according to recent reports, is greatly in excess of current requirements." Writing in the Bulletin of the National Association of Purchasing Agents, he said:

"Producing countries, at the meeting of the International Tin Study Group Working Party held at The Hague Oct. 26 to Nov. 2, seemed determined to produce a convincing case for a commodity agreement. Such an agreement, if adopted, would undoubtedly be designed to prevent violent fluctuations in the tin market with all of the disastrous consequences flowing therefrom. The burden of the producers' tribulations now seems to stem from a problem of over-production, whereas, at the June meeting of the International Tin Study Group, under-production was still considered a factor. In any event, the principal producers believe that a commodity agreement is the only measure by which the tin industry will obtain a reasonable, stable, economic price which will allow it to plan satisfactorily for the future. They argue that the economy of the principal producing areas depends very largely on tin and very little else. Consequently, if the tin-producing industry should suffer periods of depression on account of unstable prices and if mines were forced to close down, resulting in widespread unemployment of labor or a reduction in living standards, the social and political consequences might be serious. This reasoning applies particularly to high-cost producers such as Bolivia.

"From the consumers' standpoint, however, it would hardly seem fair to arrive at a reasonable world price for tin at a level high enough to support marginal producers. On the other hand, it is not believed that consumers, either in the United States or elsewhere, are desirous of bringing about a state of depression in the tin-producing areas of the world.

"If a state of equilibrium between supply and demand can be brought about, either by natural market forces or by international agreement, with a reasonable assurance that the normal requirements of industry can be met at all times, it is not believed that consumers would hesitate to pay a price for tin which would net a fair return to producers."

Copper — Consumers continue to place substantial orders for January copper, indicating they are attempting to accumulate reserve stocks. This is attributed in part to the fact domestic production plus imports do not equal consumption, resulting in a steady drain on producers' stocks.

The increase in consumption seems mainly by brass mills, which have moved up from a two or three-day week to a six-day week, says A. C. Bull, Pioneer Service & Engineering Co., Chicago. He said wire mill deliveries have not lengthened while bare and weatherproof are one week.

Lead—New bookings in the lead market remain light as consumers continue to reduce inventories. This can be done safely since supply is well in excess of current production.

Zinc—Only moderate business is being done in zinc, prices holding steady. There was a sharp rebound in shipments of slab zinc during November over October, reflecting the return of the steel mills to operation. November slab zinc deliveries totaled 73,877 tons, increase of 22,116 tons over October shipments of 51,761 tons, reports the American Zinc Institute. U. S. smelter production totaled 65,055 tons in November against 64,399 tons in October. Unfilled orders on hand at the end of November totaled 29,166 tons compared with 34,808 tons at the end of October and 87,898 tons at the end of February, the high for the year to date. Stocks of slab zinc held by producers at the end of November aggregated 89,019 tons compared with 97,841 tons at the end of October.

Industry Tin Stocks Remain Low

Washington—Because of unsettled market conditions and rapid fluctuations in the price of tin, industry stocks of the metal remain at about the same low level as they were at the close of the last quarterly report by the Department of Commerce. As importers take over the responsibility of supplying United States tin requirements, the tonnage of government inventories will be maintained for the time being at the present working level.

Department of Commerce announces that imports of tin metal and concentrates in the third quarter totaled 23,926 tons compared with 26,886 tons for the preceding quarter. The total of 72,379 tons for the first nine months is about 10,000 tons above the total for the same period in 1948 with tin metal accounting for the entire increase.

Consumption of tin and tin in alloys is running about 20 per cent lower in 1949 as compared with 1948, with the totals for the nine-month period showing 55,014 tons as against 68,267.

Total new supply of secondary tin dropped from 21,950 tons in 1948 to 16,252 tons for the like nine-month period of 1949, with the difference applying to recoverable tin in receipts of alloy scrap.

Bauxite Supply Increases

Washington—Mine production of bauxite in the United States dropped 29 per cent in the third quarter to 206,807 long tons from 291,604 tons in the second quarter, reports the Bureau of Mines. This was the smallest output for any quarter since the first quarter of 1946 and compares with 317,738 tons in the first quarter and 446,146 tons in the third quarter of last year.

Imports of bauxite totaled 704,876 tons in the third quarter compared with 514,161 tons in the second, 602,134 tons in the first and 618,092 tons in the third quarter of last year. This brought total new supply in the third quarter to 911,683 tons compared with 805,765 tons in the preceding quarter and 1,064,238 tons in the like period a year ago. Imports during the third quarter were the largest recorded for any three months period.

Pension Plan Ends Alcoa Strike

Pittsburgh — United Steelworkers (CIO) and Aluminum Co. of America reached a settlement of the 52-day strike on Dec. 7. The agreement provides for noncontributory pensions with a minimum benefit of $100 a month, noncontributory social insurance, and a program for adjusting wage inequities. Benefits will be extended to all employees, including about 10,000 represented by the AFL union at 16 plants. The CIO agreement covers employees in plants at New Kensington, Pa.; Bauxite, Ark.; Bridgeport, Conn.; Badin, N. C.; Richmond, Ind.; Detroit; Mobile, Ala.; Edgewater, N. J.; and Alcoa, Tenn.

The Alcoa agreement bases the benefit on 1.8 per cent of all straight time earnings using the 1943 earning rate for prior years of service. This differs slightly from the steel formula which provides for payment of 1 per cent of the average monthly earnings during the last ten years before retirement, multiplied by the number of years of service. Both formulas provide for retirement at the age of 65. Full payments are provided for those with 25 years of service while workers having less than 25 years, but more than 15, will receive a proportionate amount.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.
Brass Ingot: 85-5-5-5 (No. 115) 16.75-18.25c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.75c; No. 1 yellow (No. 405) 14.25-16.00c.
Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.75c, delivered.
Lead: Common 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.
Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c; grade 3, 16.00-16.25c; grade 4, 15.50-15.75c. Prices include freight at carload rate up to 75 cents per 100 lb.
5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.
Tin: Grade A, prompt delivery, 79.00c; December arrival 78.50c; January arrival, 75.75c; February arrival, 75.00c; March arrival, 74.25c. Chinese, 99% tin, prompt del., 72.00c.
RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 79.00c.
Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99% (Chinese, English, Belgium), prompt, 26.00c, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.
Mercury: Open market, spot, New York $71-$74 per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.
Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.
Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 73.25c per oz.
Platinum: $69-72 per ounce.
Palladium: $24 per troy ounce.
Iridium: $100-$110 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95% 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.
Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.
Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.
Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.
Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.30 l.c.l. 23.925, c.l. 23.425; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.35, l.c.l. 26.10, c.l. 25.60; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	**48.0**	...	...
0.156-0.203	**41.0**	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 8	18.50	11.80	9.75	79.00	17.00	32.00	40.00	73.25
Dec. 5-7	18.50	11.80	9.75	80.75–81.00	17.00	32.00	40.00	73.25
Dec. 2-3	18.50	11.80	9.75	81.00	17.00	32.00	40.00	73.25
Dec. 1	18.50	11.80	9.75	83.00	17.00	32.00	40.00	73.25
Nov. Avg.	18.427	12.348	9.760	89.823	17.00	32.00	40.00	73.25
Nov. 30	18.50	11.80	9.75	83.25	17.00	32.00	40.00	73.25
Nov. 28-29	18.50	11.80	9.75	84.75	17.00	32.00	40.00	73.25
Nov. 21-26	18.50	11.80	9.75	85.00	17.00	32.00	40.00	73.25
Nov. 18-19	18.50	12.30	9.75	85.50	17.00	32.00	40.00	73.25
Nov. 17	18.50	12.30	9.75	90.00	17.00	32.00	40.00	73.25
Nov. 16	18.50	12.30	9.75	92.00	17.00	32.00	40.00	73.25
Nov. 15	18.50	12.55	9.75	92.50	17.00	32.00	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del, New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00; under 100 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 111.00c, 500 to 999 lb, 111.50c; 200 to 499 lb 112.00c; less than 200 lb, 113.50c; ball, 1000 lb and over, 113.25c; 500 to 999 lb, 113.75c; 200 to 499 lb. 114.25c; less than 200 lb, 115.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 67.9c; 100 or 300 lb drums only, 100 to 500 lb, 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c; 10,000 lb and over, 54.4c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 96.00c; more than 2000 lb, 94.00c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 83.00c; 100 lb kegs 84.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00; No. 2 copper 14.00; light copper 13.00; composition red brass 12.25; radiators 9.25; heavy yellow brass 9.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00; No. 2 copper 14.00; light copper 13.00; refinery brass (60% copper) per dry copper content 13.00-13.25; radiators 9.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 13.00-13.25; No. 2 12.00-12.25; light copper 11.00-11.25; No. 1 composition red brass 10.50-10.75; No. 1 composition turnings 9.75-10.00; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 7.25-7.50; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.00-8.25; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.
Lead: Heavy 8.75-9.00, battery plates 4.00-4.25; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.25-9.50.
Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.
Tin: No. 1 pewter 42.00-42.50; block tin pipe 63.00-63.50, No. 1 babbitt 30.00-30.50.
Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Dec. 8, 1949; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 8	$28.58
Dec. 1	29.17
Nov. 1949	28.96
Dec. 1948	43.25
Dec. 1944	18.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$32.00
No. 2 Heavy Melt.	29.00
No. 1 Busheling	32.00
No. 1 Bundles	32.00
No. 2 Bundles	27.00*
No. 3 Bundles	25.00*
Heavy Turnings	24.50-25.00
Machine Shop Turnings	21.00-22.00†
Mixed Borings, Turnings	22.00-23.00†
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	22.50-23.00
Low Phos. Steel	*34.50-35.50*

Cast Iron Grades*

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	*39.00-40.00*
Charging Box Cast	*32.00-31.00*
Heavy Breakable Cast	*27.00-28.00*

Railroad Scrap*

No. 1 R.R. Heavy Melt.	33.50-34.00
Axles	36.00-37.00
Rails, Random Length	*36.00-37.00*
Rails, 2 ft. and under	*40.00-41.00*
Rails, 18 in. and under	*41.00-42.00*
Railroad Specialties	*36.00-37.00*
Angles, Splice Bars	*34.00-34.50*

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$30.00-30.50
No. 2 Heavy Melt. Steel	30.00-30.50
No. 1 Busheling	30.00-30.50
No. 1 Bundles	30.00-30.50
No. 2 Bundles	23.50
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	*20.50-21.00*
Short Shovel Turnings	*20.50-21.00*
Cast Iron Borings	*20.50-21.00*
Bar Crops and Plate	32.00-32.50
Punchings & Plate Scrap	32.00-32.50
Cut Structurals	32.00-32.50

Cast Iron Grades

No. 1 Cupola	44.00-45.00
Charging Box Cast	37.00-38.00
Stove Plate	38.00-39.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	31.00-32.00
Clean Auto Cast	45.00-46.00
No. 1 Wheels	39.00-40.00
Burnt Cast	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	38.00-39.00
Cast Steel	35.00-36.00
Railroad Specialties	*36.00-36.50*
Uncut Tires	*37.00-38.00*
Angles, Splice Bars	41.00-42.00

VALLEY

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	30.50-31.00
No. 1 Bundles	32.50-33.00
No. 2 Bundles	25.00-25.50
Machine Shop Turnings	22.50-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	23.50-24.00
Low Phos.	34.50-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$24.50-25.00*
No. 2 Heavy Melt. Steel	*23.00-23.50*
No. 1 Busheling	*23.00-23.50*
No. 1 Bundles	*25.00*
No. 2 Bundles	*21.50-22.00**
Machine Shop Turnings	*16.50-17.50*
Short Shovel Turnings	*18.50*
Mixed Borings, Turnings	*15.50-16.00**
Bar Crop and Plate	*27.50-28.50*
Punchings & Plate Scrap	*27.50-28.50*
Cut Structurals	*26.00-27.00*
Elec. Furnace Bundles	*25.00-26.00*
Heavy Turnings	*24.00-25.00*
No. 1 Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	*37.00-38.00*
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	30.00-31.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	*37.50-38.50*
Malleable	39.00

* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	*$28.50*
No. 2 Heavy Melt. Steel	*26.50*
No. 1 Busheling	*28.00*
No. 1 Bundles	*28.50*
No. 2 Bundles	*23.50*
Machine Shop Turnings	*16.00*
Short Shovel Turnings	*19.00*
Mixed Borings, Turnings	18.00
Cast Iron Boring	*19.00*

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	33.00
Heavy Breakable Cast	36.00
Stove Plate	32.00
Unstripped Motor Blocks	22.00
Brake Shoes	24.00
Clean Auto Cast	42.00
Drop Broken Cast	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	*34.00*
Rails, Rerolling	*38.00*
Rails, Random Length	*36.00*
Rails, 18 in. and under	45.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$25.00-26.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.00-26.00
No. 1 Busheling	28.00-30.00
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings	21.00-22.00
Cast Iron Borings	21.00-22.00
Punchings & Plate Scrap	28.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Heavy Breakable Cast	32.00-33.00
Clean Auto Cast	36.00-37.00

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	25.50-26.00
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Short Shovelings	22.50-23.00
Low Phos.	31.50-32.00

Cast Iron Grades

No. 1 Machinery	39.50-40.00
No. 1 Cupola	36.00-37.00
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under.	38.00-39.00
Scrap rails	35.00-36.00
Specialties	35.00-36.00
No. 1 car wheels	36.00-37.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$21.00-22.00*
No. 2 Heavy Melt. Steel	19.00-20.00
No. 1 Busheling	19.00-20.00
No. 1 Bundles	*21.00-22.00*
No. 2 Bundles	18.00-19.00
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings	11.00-12.00
Punchings & Plate Scrap	22.00-23.00
Cut Structurals	22.00-23.00
Elec. Furnace Bundles	22.00-23.00

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery	31.00-32.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	36.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$20.00-21.00
No. 2 Heavy Melt. Steel	18.00-18.50
No. 1 Bundles	20.00-21.00
No. 1 Busheling	18.00-18.50
Machine Shop Turnings	12.50-13.00
Mixed Borings, Turnings	12.50-13.00
Short Shovel Turnings	14.00-14.50
Bar Crops and Plate	22.00-22.50
Punchings & Plate Scrap	22.00-22.50
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	28.00-29.00
Mixed Cast	25.00-26.00
Heavy Breakable Cast	26.00-27.00
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	*$28.00-30.00*
No. 2 Heavy Melt. Steel	*25.00-26.00*
No. 1 Bundles	*28.00-30.00*
No. 2 Bundles	*23.00-24.00*
Machine Shop Turnings	*18.00-19.00*
Mixed Borings, Turnings	*18.00-19.00*
Short Shovel Turnings	*19.50-20.50*
Cast Iron Borings	*18.00-19.00*
Bar Crops and Plate	*30.00-31.00*
Punchings	*30.00-31.00*
Elec. Furnace Bundles	*28.00-29.00*
Heavy Turnings	*23.00-24.00*
Cut Structurals	*29.00-30.00*

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	*32.00-33.00*
Stove Plate	*32.00-33.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00-31.00
Malleable	37.00-38.00
Rails, Rerolling	*43.00-44.00*
Rails, Random Lengths	*36.00-37.00*
Rails, 2 ft. and under	*41.00-42.00*
Rails, 18 in. and under	*42.00-43.00*
Railroad Specialties	*32.00-33.00*
Angles, Splice Bars	36.00-37.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.00
No. 2 Bundles	22.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	30.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R. R. Malleable	nominal
Rails, Rerolling	37.00
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	31.00-33.00

ST. LOUIS

No. 1 Heavy Melt. Steel	*$31.00-32.00*
No. 2 Heavy Melt. Steel	*26.00-27.00*
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	*21.00-22.00*

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	32.00-33.00
Clean Auto Cast	*39.00-41.00*
Burnt Cast	*31.00-32.00*

Railroad Scrap

R.R. Malleable	31.00-32.00
Rails, Rerolling	40.00-42.00
Rails, Random Lengths	*36.00-37.00*
Rails, 3 ft. and under	*38.00-39.00*
Uncut Tires	29.00-30.00
Angles, Splice Bars	*36.00-37.00*
Railroad Specialties	33.00-34.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Wheels	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	22.00
Cut Structurals	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-27.50
Heavy Breakable Cast.	20.00
Stove Plate	20.00
Unstripped Motor Blocks	18.00
Malleable	20.00
Brake Shoes	18.00
Clean Auto Cast	25.00
No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast	$32.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	32.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades*

Cast	40.00-43.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.

SCRAP COMES INTO ITS OWN

The vision of Abram S. Hewitt is largely responsible for the introduction of open hearth furnaces into the United States. He saw an exhibit of a new process at the Paris Exposition of 1867 which convinced him that greater economical conservation of natural raw materials could be effected by using scrap iron and steel. This process was a vast improvement, conservation-wise, over the Bessemer furnace which consumed practically no scrap. In 1869 the first open hearth furnace for the manufacture of steel commenced operations in this country. Today, this tremendous industry has developed to the extent that open hearth furnaces produce steel containing up to 80% scrap. Concurrent with the extensive use of the open hearth furnaces in this country, Luria Brothers & Company, Inc. commenced to serve the industry with their scrap requirements. Today, with our widespread organization and experience, we continue to serve consumers and sellers of scrap, regardless of amount or specification.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

Main Office

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.
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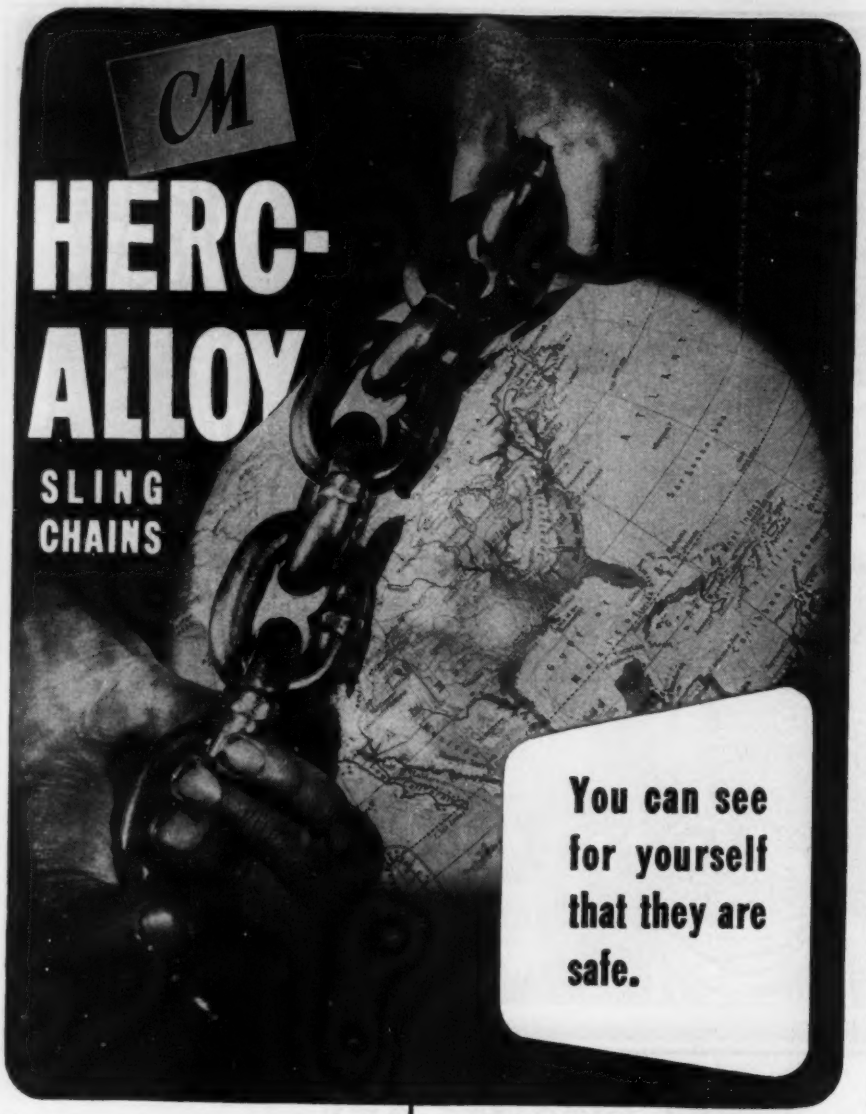
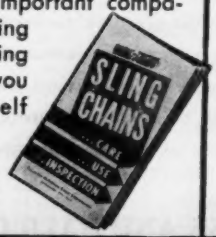
BOSTON, MASS. Statler Bldg.	CLEVELAND, O. 1022 Midland Bldg.	LEBANON, PA. Luria Bldg.	PUEBLO, COLO. 334 Colorado Bldg.
BUFFALO, N.Y. Genesee Bldg.	DETROIT, MICH. 2011 Book Bldg.	NEW YORK, N.Y. Woolworth Bldg.	READING, PA. Luria Bldg.
ST. LOUIS, MO. 2110 Railway Exchange Bldg.		SAN FRANCISCO, CAL. Pacific Gas & Elec. Co., Bldg.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889



● Just one of the big advantages of HERC-ALLOY Sling Chains is that you can determine their serviceability by a simple visual inspection.* Ordinary steel or iron chains, on the contrary, grow dangerously brittle with age... an insidious threat to the safety of men and materials. That's why more and more of the important companies are standardizing on HERC-ALLOY Sling Chains... because you can **see** for yourself that they're safe.

Write for your copy of this new, informative booklet. No charge.



HERC-ALLOY FEATURES

- America's *first* alloy steel sling chain... first to bear a serial number.
- *Every* CM HERC-ALLOY Sling Chain is alloy steel throughout... links, rings, hooks. There is only one grade... *the best.*
- Every chain is individually tested and accompanied by a certificate of registration.
- Links are side welded for maximum strength by patented INSWELL electric method.
- HERC-ALLOY Chains should *never* be annealed.
- HERC-ALLOY Chains are lighter... stronger... easier to handle... outlast ordinary chains 4 to 5 times... cost less on the job.

HERC-ALLOY... the chain you can *SEE* is safe

COLUMBUS-McKINNON
CHAIN CORPORATION
Affiliated with Chisholm-Moore Hoist Corporation
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

Sheets Strip . . .

Sheet and Strip Prices, Page 141, 142, 143

Cleveland—Most active spot in any steel company office these days is the flat-rolled steel division. Things are really jumping there, reminiscent of the shortage days of 1947-48. Buyers of all classifications are pressing to get on order books which are loaded through first quarter in most cases and in a few instances through first half. Republic Steel Corp. has enough flat-rolled tonnage booked to support operations for first six months, according to J. M. Schlendorf, vice president in charge of sales.

New York—Pressure for sheets is strong, with sellers sold out on major grades for first quarter and beyond in some cases. Actually sellers generally could book their entire capacity for first half on hot and cold-rolled and galvanized sheets were they disposed to do so.

Philadelphia — With sheet mills booked far ahead, volume of new orders should be declining. If so, the effect is obscured by consumer efforts in shopping around for position on new orders and in pressing for tonnage already placed. Stronger price tone is an increasing factor in pressure for the expediting of mill shipments.

Pittsburgh — Heavy pressure for prompt deliveries of sheet and strip continues. Backlogs are extended four months on galvanized and three to four months on most other items. Consumers anticipate an average increase of $3.50 per ton throughout the entire steel product classifications in form of extra adjustments.

Youngstown — Mahoning Valley Steel Co. has announced increases of $10 per ton on hot-rolled sheets, enameling sheets and silicon sheets.

Cincinnati — Production of sheets has not yet reached prestrike levels due to repair work. Mills continue to check on carryover tonnage before fixing quotas for first quarter schedules. A price increase on galvanized may be imminent.

St. Louis—Sheet demand is on the upgrade, stimulated by an unexpected upturn in buying by stovemakers.

Granite City Steel Co. now estimates second quarter demand will exceed its sheet capacity by 60 to 70 per cent, compared to 30 to 40 per cent a week ago. Granite City will shut its tin plate mill Jan. 15 to probably mid-April, to add more electric generating units and more tanks.

Birmingham — Order books on sheets are full three months ahead which is the limit local producers care to accept business. There has been no slackening in sheet orders and tonnage is moving on allocation.

Seattle — Plate inventories are down, but shops report sufficient material for current needs as business is slow and no large projects are pending.

San Francisco — Steel demand is concentrated on efforts to obtain flat-rolled products which are in tight supply. The scarcity of strip and galvanized sheets is greatest.

Los Angeles—Specifying is close to the vest, and demand has eased noticeably in all flat-rolled products, with the exception of hot and cold-rolled sheet and cold-rolled strip.

Steel Bars . . .

Bar Prices, Page 141

Chicago—Popular small and medium size carbon and alloy bars will be in fairly tight supply into first quarter, but delivery of large sizes is promised in the normal lead time of 5 to 6 weeks. A few metalworking plants still encounter difficulty with individual bar items and bar size shapes, but many were comfortably stocked before the strike and notice only minor unbalances now.

New York—Hot carbon bar consumers report little difficulty in placing orders for shipment by mid-January. They are getting fairly caught up on their working inventories and most of them expect to be in a fairly comfortable position by yearend. Consumers generally contemplate a good first quarter and indicate needs will be fairly steady throughout the period.

Cleveland—Sellers will enter the new year with a substantial volume of hot-carbon bar business on books. Pressure for tonnage is not comparable with that for the flat-rolled products, openings being available for first quarter shipment. Alloy bars are available for early shipment though Republic Steel Corp. reports it has enough orders on books to sustain operations for 60 days.

Boston—Except for diversified tonnage for Springfield Armory, mostly alloy for rifle barrel blanks, large inquiries for bars are few. Buying is geared to maintenance of inventory and in relatively small lots.

Pittsburgh—Heavy demand for carbon and alloy bars is noted from automotive parts producers, sash and casement interests and farm implement manufacturers. Automotive interests have reverted to steel conversion deals in efforts to supplement steel supplies.

Philadelphia—One large hot carbon bar seller is virtually out of the market for January, but consumers can cover their needs by shopping around.

Birmingham — Bar production is close to capacity. Demand, especially for concrete reinforcing bars, continues active.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Cleveland—Seasonal influences are being felt in the reinforcing steel bar market in this area. While open weather so far has encouraged more active building than usual for this season, the number of jobs coming out is fewer and tonnages are small.

Los Angeles — Urgency of reinforcing bar needs has diminished, although demand remains heavy. Current requirements stem principally from a multitude of small projects.

San Francisco—No great rush is apparent for reinforcing bars and supplies generally are ample. Seasonal factors are affecting current demand.

Seattle—Seasonal recession is reflected in reduced rolling mill operations. Recent bookings have involved small tonnages of reinforcing bars, but important public works projects are to be up for bids within sixty days.

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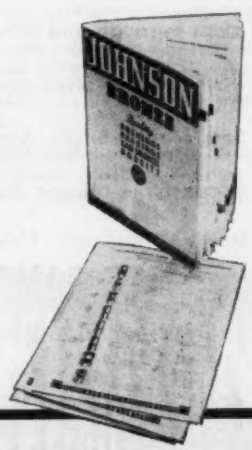

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Plates . . .

Plate Prices, Page 141

Chicago—Universal and floor plates are easiest of standard flat-rolled products to obtain locally. Continuing scarcity of orders from freight car builders is reflected in the slow demand and, for this reason, steel officials are closely watching recent car inquiries as possible indicators of a recovery trend. Sheared plates are being sought by line pipe producers.

New York—Eastern plate producers will enter 1950 practically current. Until only the past few days, most producers could still work in a little tonnage for delivery against new orders before end of the month. Now, delivery promises generally fall in January; some mills are booked well into that month on the lighter gages.

Philadelphia — While most plate producers can make deliveries within three to four weeks, at least two large interests have little to offer under six to eight weeks. Demand for light plates is contributing most toward activity. This demand is diversifield and is brisk, despite a seasonal lag in fuel oil tanks and heating equipment.

In addition to the Pennsylvania, which recently closed on tonnage for car repairs, another eastern railroad is in the market for similar needs for the first quarter.

Birmingham — Plate demand remains relatively good in this territory. While not on a par with previous years, it is in excess of supply due to removal of the greater part of Republic Steel Corp.'s tonnage.

Los Angeles—Demand has lightened in all plate categories, with plenty of room on mills' first quarter books. Requirements of smaller fabricators and warehouses have receded. Kaiser is allocating through January.

San Francisco—Seasonal letdowns are affecting demand for plates. Supplies in most instances are ample.

Asks Ruling on Plate Contract

Boston—To what extent political or public pressure may be legally exerted on a contractor or potential contractor in his purchase of materials needed for public work contracts is involved in delays revolving around 2000 tons of steel plates for a 48-inch water line section recently bid to the Metropolitan District Commission, a state agency. DeMatteo Construction Co., Quincy, Mass., was low at $1,586,513.05, for this 48-inch steel pipe line, Boston-Quincy-Milton to connect with Blue Hills reservoir. Alternate bids on pipe covered steel and reinforced concrete. Steel pipe estimates are reported low.

When the contractor, alleged to have failed to give assurance fabricated pipe would be awarded Walsh-Holyoke Steam Boiler Works, Holyoke, Mass., the Governor's Council voted, six to three, to reject award of contract to DeMatteo. Members in the majority wanted assurance pipe would be fabricated in Massachusetts. Question is raised by the minority as to authority of the council to approve Metropolitian District Commission contracts; matter now rests with state attorney-general for a ruling.

Tin Plate . . .

Tin Plate Prices, Page 142

Pittsburgh—Electrolytic tin plate production schedules are filled through most of first quarter. Some interests have accepted commitments into May and June. Hot-dipped tin plate is available in February. General line can demand is holding up fairly well, but emphasis is centered in electrolytic for such items as beer and coffee containers. Fact electrolytic now is permissable in place of black plate is an additional factor.

Cleveland — Tin plate contract prices for 1950 are expected to be announced within a few days. The subject was under study last week, but no indication was given as to what action was contemplated. Producers are experiencing difficulty in determining firm price policy because of the uncertainties attending pig tin prices. Tin has dropped from around 94 cents a pound at the beginning of November to today's level of 79 cents.

Structural Shapes . . .

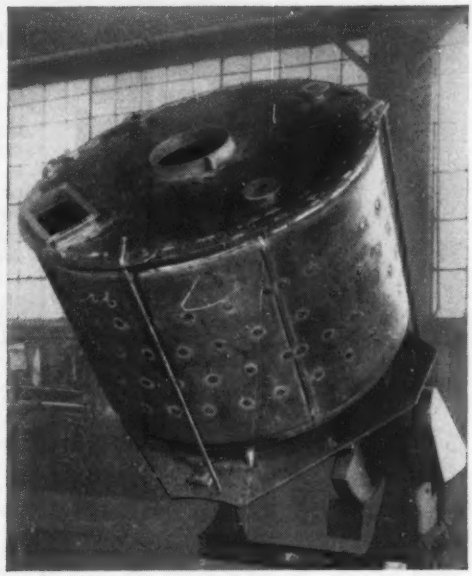
Structural Shape Prices, Page 141

Philadelphia—Following some delay, Phoenix Iron & Steel Co., Phoenixville, Pa., has placed its smaller shape mill into operation, bringing in semifinished from another district mill until its own open hearths are ready for production, which should be around mid-January. Phoenix Bridge Co., is in full operation. The Phoenixville shape producer is quoting standard sections at 3.30c, mill. Shape deliveries range four to six weeks on standard sections and eight to 11 weeks on wide flange.

Chicago—Highly competitive conditions among fabricators are expected within a few months, the work in most larger shops being expected to be completed by then. At the moment activity is good, several major interests being occupied with important jobs, tonnagewise, from a variety of projects. Bidding is active on new jobs from shops which have proper steel in stock or soon promised. Wide flange beams are in tightest supply and strongest demand. Standard shapes are easy to obtain, about eight weeks' delivery being promised. Shapes of this kind would spring into stringent position, some mills say, if freight car building comes back to any extent.

Seattle—Fabricating shops report some small jobs, but recently no large tonnages have been booked. Operations are slowed accordingly. Backlogs are disappearing, and management expects little improvement for 60 days. Competition from outside interests is increasing.

San Francisco — Resumption of Geneva Steel Co.'s structural mill will make available heavier structural shapes which have frequently been hard to obtain from eastern mills. Demand although still lagging, has picked up from the early autumn slump. If present planning for a number of new private projects eventuates, a sharper recovery may be felt by spring. Public works, show signs of continuing actively.



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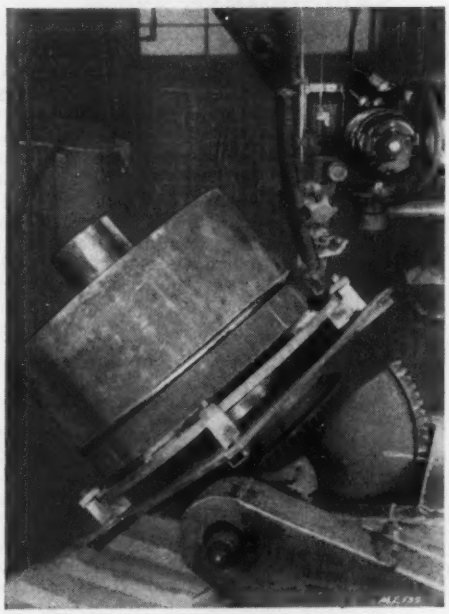

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Tubular Goods . . .

Tubular Goods Prices, Page 144

Cleveland—No early easing in pressure for tubular goods is in prospect though demand is less intensified than it was some months back. With most of the pipe mills again producing at prestrike levels, apprehension with respect to deliveries has evaporated. Indicative of tight supplies, Republic Steel Corp. has a year's business in oil country goods on its books, while its bookings of large size pipe, 24 to 36 inches, are sufficient for two years.

Pittsburgh—Warehouse stocks of standard pipe items, nearly depleted throughout the strike period, have recorded little improvement despite the rapid return to full mill production schedules. Producers' orders backlogs extend into late first quarter on butt weld and into April and May on seamless. Deliveries on mechanical and pressure tubing are available within five to seven weeks.

Los Angeles—Pipe producers are at virtual capacity, although demand has eased. Eastern sellers are expected back in this market shortly. Kaiser Steel Corp.'s pipe facilities are booked through first quarter; books are not yet open for second.

Seattle—Cast iron pipe is slow and no improvement is expected until February. Some small orders are moving out of inventory.

Semifinished Steel . . .

Semifinished Prices, Page 141

Pittsburgh—Supply of semifinished steel items, with exception of wire rods and to a lesser extent sheet bars, is meeting requirements of nonintegrated steel interests. Some wire producers have rejected orders for wire rods because of their own increased needs to meet unfilled orders accumulated in the strike period. At least one producer is expected to advance sheet bar prices before year-end.

Wire . . .

Wire Prices, Page 143

Boston—Wire consumers expect price increases next quarter, from $3 to $5 a ton on some products. Current buying is toward correcting inventory.

Pittsburgh—Producers are booked three months ahead on manufacturers' wire items and two months ahead on merchant products. Stocks of merchant items held by warehouses are unbalanced, particularly in nails.

Chicago—Wire makers tend to be skeptical of the permanency of their present improved business. Demand for most merchant products is adversely affected seasonally despite the long production stoppage. Manufacturers' wire is urgently needed by consumers. With no exceptions here, plant curtailments are traceable to lack of some sheet-using product or component.

Birmingham—Most wire products remain in good demand, although there is a seasonal slacking. Nail demand is spotty, but most popular sizes are readily obtainable.

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Metallurgical Coke . . .

Metallurgical Coke Prices, Page 144

Hamilton, Ont. — Hamilton By-Products Coke Ovens Co. Ltd. and the Steel Co. of Canada increased the price of coke $1 a ton.

Iron Ore . . .

Iron Ore Prices, Page 145

Cleveland—Movement of iron ore on the Great Lakes, including Canadian shipments, in the 1949 season to Dec. 1 totaled 69,385,549 gross tons, decrease of 13,050,825 tons from the 82,436,374 moved in the 1948 season. November shipments amounted to 1,103,167 tons, decrease of 6,136,185 compared with November, 1948 shipments.

With the Escanaba docks loading final ore cargoes the 1949 ore movement will fall about 15 per cent below that of 1948.

Pig Iron . . .

Pig Iron Prices, Page 140

Cleveland—Active demand for pig iron through first quarter is expected in the merchant trade, but a note of uncertainty prevails with respect to second quarter business. Foundries catering to the automotive and sanitary ware trades are actively contracting for their first quarter pig iron requirements. All signs point to an active first quarter in these industries.

Youngstown — Twenty blast furnaces are operating here and plans are under way for adding several more to the active list shortly. Struthers Iron & Steel Co. shortly will put its Struthers stack in operation. This has been down since last spring, and since has been relined and rebuilt at a cost of $500,000. Youngstown Sheet & Tube Co. is holding off starting its Hubbard furnace for the present, while Sharon Steel Corp. is awaiting larger coke supplies before starting a second blast furnace at its Farrell works. Carnegie-Illinois Steel Corp. and Republic Steel Corp. each have one blast furnace being rebuilt.

New York—Pig iron buying continues to ease as district foundries have fair inventories and are not concerned over ability to get replacements as required.

Philadelphia—Although many foundries are operating on a restricted basis, some of the more active are large plants, and therefore, specifications are fairly good. In addition, two basic consumers have placed tonnage for the first time in quite a while.

Pittsburgh—Carnegie-Illinois Steel Corp. blew in its number five blast furnace Dec. 5 at its Duquesne Works. This stack had been idle since June 28. No. 2 furnace at the Midland plant of Crucible Steel Co. of America was blown in Dec. 4. This is the first time since March full pig iron production schedules have been reported at Midland. Indicative of current heavy steel demand, pig iron output is approaching record levels. Pittsburgh Coke & Chemical Co. is booked well into January and anticipates local demand for merchant iron will take entire output at least through first quarter.

Chicago—This district now has 34 blast furnaces in blast out of 42 existing units. Most recent change in this total occurred Dec. 1 when Wisconsin Steel Co. blew out its No. 3 furnace for repairs to require about six week. No. 11 at Carnegie-Illinois' Gary Works was taken off the active list last Monday for repairs of several months' duration.

St. Louis—Pig iron demand is generally upward, though spotty, with basic holding up the best. Local production is now a trifle over 1000 tons daily following Koppers' resumption of its second furnace.

Cincinnati—Foundry melt is spotty and disappointing in volume. Demand failed to expand after the strike, but cutbacks are few.

Birmingham — With all the district's blast furnaces blowing excepting one at Ensley, pig iron production is at virtual capacity. All merchant furnaces are in blast. Demand for iron is believed sufficient to continue capacity operations at least through first quarter.

Buffalo—With foundry demand for merchant iron lagging, it is estimated that from 75 to 80 per cent of current production consists of basic material. Pig iron output is at 87.5 per cent of capacity. With ingot production holding at capacity, all leading mills are confining operations to basic iron.

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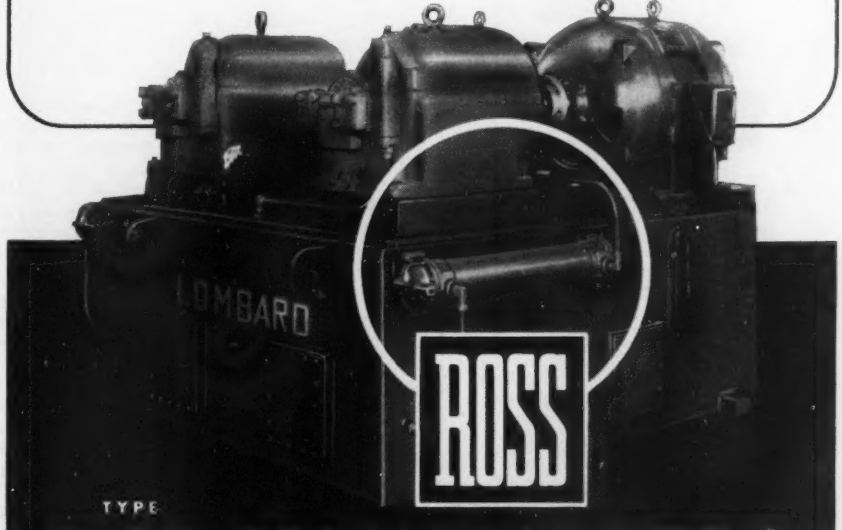

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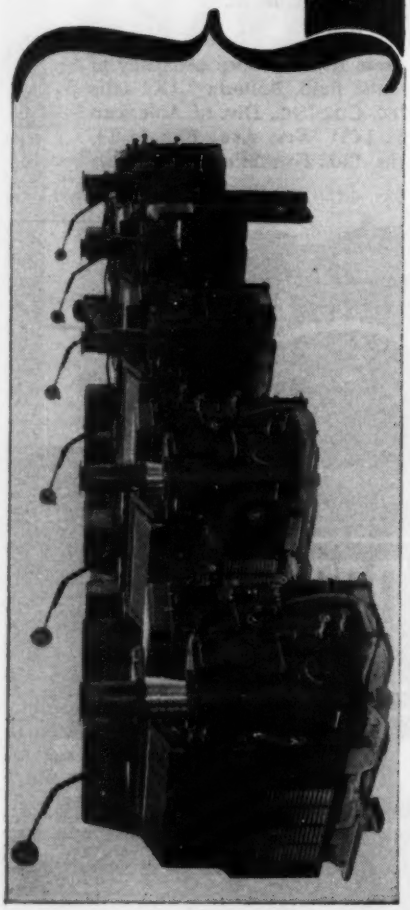

Scrap . . .

Scrap Prices, Page 148

Pittsburgh—Scrap market is expected to remain quiet here until after the yearend. Undertone of the market for open-hearth grades is soft, although brokers and dealers insist no offers to sell at less than reported quotations have been made.

Chicago—Traders generally are more occupied with obtaining releases for scrap on old orders than with soliciting new business. Some mills are limiting shipments to three or four cars a day. Almost complete lack of new business has put some dealers in distress, and inventory accumulation is becoming a more serious problem. Desire to sell weakened prices on virtually all grades last week, despite the continuing payment by one mill of $30 for No. 1 heavy melting on direct shipment from some industries.

Cleveland—No very substantial buying is expected now before Jan. 10. Based on sales in nearby districts, borings and turnings are slightly higher. Lacking confirmation of sales, No. 1 heavy melting railroad scrap is unchanged at $33-$34, although New York Central got $34.50 for part of its latest offering and $35 for the balance. Railroad specialties are $36-$36.50; uncut tires, $37-$38.

Philadelphia—Further weakness has developed in scrap, with the principal steel grades off $1 to $1.50 a ton on representative buying. No. 1 heavy melting steel is weak at $24.50-$25; No. 2 melting steel and No. 1 busheling, $23-$23.50. No. 1 bundles is $25 and No. 2 bundles nominally $21.50-$22.

Machine shop turnings have declined to $16.50-$17.50 and short shovel turnings to $18.50. Mixed borings and turnings are off nominally to $15.50-$16.

Weakness also is noted in low phos scrap with bar crop and plate and punchings and plate scrap off 50 cents to $27.50-$28.50. Cut structurals are down to $26-$27; electric furnace bundles, $25-$26. Heavy turnings are quotable at $24-$25. No. 1 machinery is lower at $37-$38; No. 1 wheels at $37.50-$38.50.

New York—Brokers have reduced buying prices on No. 1 heavy melting steel and No. 1 bundles to $21-$22, fob shipping point.

Cincinnati—Scrap prices excepting cast grades, are lower. Mills are accepting tonnage liberally to fortify winter stocks; hence, dealer activity is keyed to December delivery.

Buffalo—Easier tendencies developed in the scrap market, but prices are unchanged in the absence of new business.

St. Louis—Increasing resistance to high prices forced down the majority of melting steel quotations $1 a ton, the first general decrease in two months. No. 1 is offered at $31 delivered and Granite City Steel Co. has obtained a 60-day supply of No. 2 at $26. Most railroad steel prices are correspondingly lower, as are cast iron grades. Foundries' scrap needs are low. Mill stockpiles are spotty, but overall demand is off because most of them either have adequate tonnage on hand or on order.

Seattle—Scrap is quiet with Beth-

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lehem Pacific Coast Steel Corp. out of the market while using inventory. Northwest Steel Rolling Mills Inc. is buying in limited volume, but is adding slightly to inventory. Supplies are ample. Prices are unchanged.

Los Angeles—Mill buying is fair with specifying limited to No. 1 and 2 heavy melting steel.

San Francisco—Recent movement in prices of scrap in eastern centers has no counterpart here.

Warehouse . . .

Warehouse Prices, Page 145

Cleveland—Warehouse steel order volume is off noticeably from the October-November level. Even before the steel strike ended, distributors had noted a contraction in demand and this is more in evidence today with the steel mills again in production. While volume in general is considered normal, one large warehouse interest describes current demand as subnormal. Curtailed operations at a number of manufacturing plants, including several important stamping shops, account in part for current dull warehouse trade.

Cincinnati—Demand for warehouse steel is steady. Supply continues affected by strike against the local warehouse of Joseph T. Ryerson & Son Inc. Mill shipments are not yet back to normal. Prices are unchanged.

Pittsburgh—Demand for warehouse steel with the exception of sheets and strip has been disappointing since end of the steel strike. Mill customers are obtaining their requirements readily from regular sources. December normally is a low-volume order month within the warehouse trade because of yearend inventory considerations. Shipments have been unusually heavy since the strike, resulting in well balanced warehouse stocks, except for cold-rolled and galvanized sheets.

Philadelphia—Warehouse business has declined this month, reflecting freer flow of mill shipments to consumer plants. Sheet demand is strong, but distributors have difficulty in obtaining stocks. Leading general distributors' stocks except sheets, are in fairly good balance. Downward trend in business is expected to continue over remainder of the month.

Milwaukee—Some relief from the supply pinch is offered warehouse buyers in this area by shipments from Chicago, the latter city's distributors in most cases having larger facilities and better stocks. At neither point are certain bar sizes and most sheet gages available. In most critical condition are galvanized stocks; consumers are operating in varying degrees of curtailment, about 20 percent reduction being common. Shape supply is relatively good in a number of sizes, but nonexistent generally in wide flange beams.

Seattle — Turnover of warehouse steel in November showed a decline compared with October when buying was brisk due to the steel strike, consumers fearing a prolonged tieup. Light gage galvanized sheets are the only item in tight supply, late January being the earliest delivery date promised by coast mills. The price

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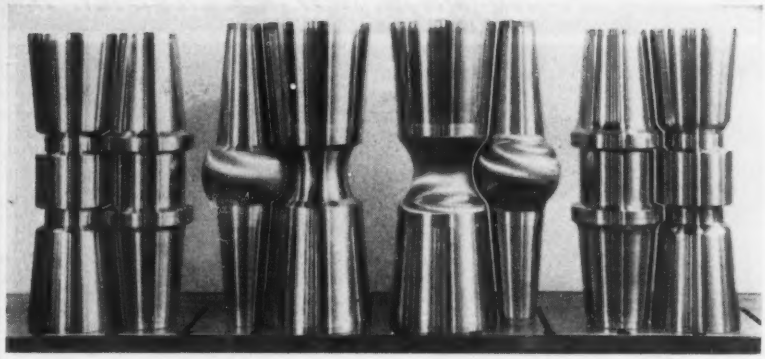

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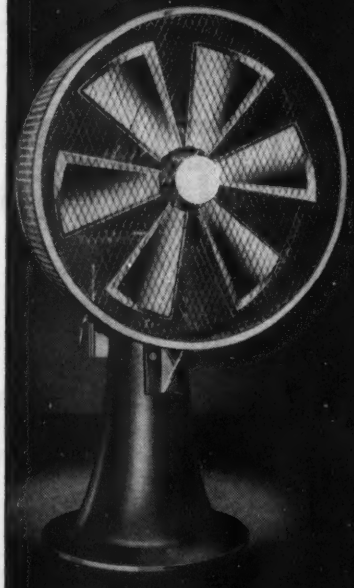

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situation is steady and unchanged.

Los Angeles — Warehouse activity has turned extremely spotty. Demand is strong for light gage sheets and cold-rolled strip, but requirements have tapered in other categories. Prices are steady, though observers say the pricing structure here has stabilized at too low a level to permit adequate profit margins. Competitive pricing has made itself felt most severely on material shipped from other districts.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 144

Pittsburgh — Fastener producers are receiving a large volume of business. Some have increased production schedules to four days a week. Those producers who operated throughout the strike period had low stocks of wire rods and other semi-finished material at the end of the shutdown, but mill receipts are now sustaining operations. Customers are expected to restrict orders over the balance of this year to keep yearend inventories low.

Refractories . . .

Refractories Prices, Page 145

Pittsburgh—Refractory brick demand continues above prestrike level. Producers are able to offer brick within standard sizes and specification from inventories. Specialty items are available in 5 to 6 weeks.

The Bethlehem pension formula has spread to the refractory brick industry. The AFL United Brick & Clay Workers has signed agreements on that basis with several producers.

Rails, Cars . . .

Track Material Prices, Page 143

New York—Domestic freight car orders last month totaled 1145 units, of which 95 were placed with the commercial shops and 1050 with railroad shops, reports American Railway Car Institute. This compares with 201 cars placed in October.

November deliveries comprised 4376 cars against 4532 in October. Of November deliveries, 2649 were from commercial builders, and 1727 from railroad shops.

Backlogs as of Dec. 1 amounted to 9106 for railroad shops and 5040 for commercial shops, or a total of 14,146, against 17,377 on Nov. 1 and 106,405 a year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1450 tons, New York University Law School, Washington Square, New York, through John Lowry, general contractor, to Harris Structural Steel Co., that city.

1250 tons, Chief Joseph dam, Columbia river, to Kansas City Structural Steel Co., Kansas City, Mo.; Guy F. Atkinson Co., Seattle, general contract.

425 tons, plant addition, Standard Pressed Steel Co., Jenkinstown, Pa., to Bethlehem Contracting Co., Bethlehem, Pa.

330 tons, Simpson street bridge, Chicago, Edens Superhighway, to American Bridge Co., Pittsburgh.

300 tons or more, F. W. Woolworth store.

FURNACE PROBLEMS

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SEMISILICA BRICKS

When heating furnace roofs, open hearth regenerator roofs and hot blast stoves are operating in the temperature range of 2200F.-2700F. for sufficient time to cause "First Quality Clay Bricks" to spall and vitrify or sag—and where the performance of silica bricks is hindered by shutdowns and severe temperature changes, a need is created for REMMEY RM Semisilica bricks.

If your furnace problem falls in this category, Semisilica bricks are the answer . . . specify REMMEY RM Brand SEMISILICAS.

REMMEY

Dependable Refractories

RICHARD C. REMMEY SON CO.
Philadelphia 37, Pennsylvania

Tacoma, Wash., to unstated California fabricator.

300 tons, Peoria street bridge, Chicago, to American Bridge Co., Pittsburgh.

225 tons, Edens Parkway, sec. 263-0808-1-150, Chicago, to American Bridge Co., Pittsburgh.

140 tons, bridge, sec. 263-1212-1-150, Cook county, Illinois, to American Bridge Co., Pittsburgh.

140 tons, building, Hubbard Spool Co., Garrett, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

140 tons, apartment house, 99th street and 65th road, Queens, New York, to Grand Iron Works Inc., that city.

STRUCTURAL STEEL PENDING

2500 tons, veterans hospital, Philadelphia; bids postponed from Dec. 5 to Dec. 13.

1500 tons, collateral requirements of Chesapeake Bay bridge in connection with Cofferdam, Baltimore; pending.

1132 tons, state bridge work, Allegheny county, Pennsylvania, bids Dec. 21; also 558 tons of bars.

400 tons, Maryland state Kent Island bridge; McLain Construction Co., Baltimore, low on general contract.

300 tons, first unit Seattle viaduct; bids Dec. 20.

295 tons, state bridge, Swanger county, Pennsylvania; John Swanger, Lancaster, Pa., low on general contract.

292 tons, state bridge work, Northampton county, Pennsylvania; bids Dec. 21.

Unstated, University of Washington stadium; bids late December.

REINFORCING BARS . . .

REINFORCING BARS PLACED

125 tons, Chief Joseph dam, to Bethlehem Pacific Coast Steel Corp., Seattle; Guy F. Atkinson Co., Seattle, general contract.

REINFORCING BARS PENDING

2250 tons, Garrison dam, Riverdale Junction, N. D.; United States Steel Supply Co., Chicago, low bidder.

1350 tons, first unit Seattle highway viaduct; bids Dec. 20.

435 tons, outlet sewer, cont. 2, Chicago; Michael Pontarelli Inc., that city, low on general contract.

322 tons, apartment, 860 Lake Shore Dr., Chicago; bids taken Nov. 30.

237 tons, high school, Arlington Heights, Ill.; Dupark Construction Co., Chicago, low on general contract.

100 tons, Bureau of Public Roads bridge and viaduct, Mount Rainier National Park; Hawkins & Armstrong, Seattle, low $313,726, recommended for award.

Unstated, riprap project Columbia river near Coulee dam; Morrison-Knudsen Co., Seattle, general contract.

Unstated tonnage, Illinois state highway bridges; bids taken at Springfield, Ill., Dec. 2.

Unstated tonnage, apartment ,1350 Lake Shore Dr., Chicago; bids taken Nov. 30.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Netherlands Railways, 25 electric locomotives of 105 metric tons each, to the Baldwin Locomotive Works, Eddystone, and Westinghouse Electric Corp., Pittsburgh, which will work jointly on the construction of the equipment.

Western Pacific, 11 Diesel-electric locomotives, to the Electro-Motive Division, General Motors Corp., LaGrange, Ill.

RAILS PLACED

New York Central, 75,000 net tons of rails and joint bars; $5 million order distributed among Inland Steel Co., Bethlehem Steel Co. and Carnegie-Illinois Steel Corp.

RAILROAD CARS PENDING

Lehigh & New England, 35 seventy-ton covered hopper cars; bids asked.

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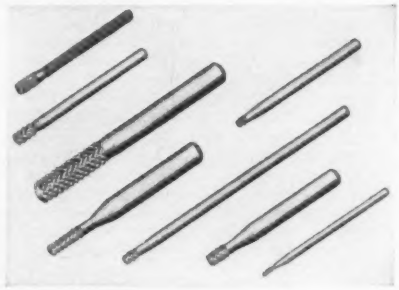

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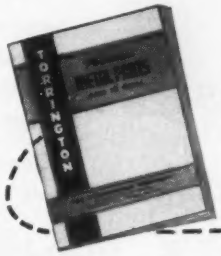

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BETTERAVIA, CALIF. — Union Sugar Co. plans to spend $500,000 for machinery and equipment to complete the expansion and modernization of its beet sugar factory. Installations will require two years for completion, and will give the plant a daily slicing capacity of 2800 tons of sugar beets.

EMERYVILLE, CALIF. — Shell Development Co. has awarded to Christensen & Lyons, Oakland, Calif., a contract for the construction of an administration building. New structure will include additional laboratory facilities.

LOS ANGELES—University of Southern California will begin construction early next year on a $1 million medical building for heart disease and cancer research.

DELAWARE

DOVER, DEL.—Namreed Corp., machines, has been chartered by the corporation department of the Secretary of State's office. Capital of the firm was listed at 200 shares of stock, no par value.

WILMINGTON, DEL.—Econometal Corp., machines and tools, has been chartered by the corporation department of the Secretary of State's office at Dover, Del. Capital of the firm was listed at 1000 shares of stock, no par value. Corporation Trust Co., 100 W. 10th St., Wilmington, is serving as the principal office.

WILMINGTON, DEL. — American Delaware Bridge Co., contractor for the steel work of the $40 million Delaware River Memorial Bridge near Wilmington, has moved on the job and is making preparations to lay the first sections of steel on the New Jersey and Delaware approaches of the bridge early in January.

FLORIDA

PALATKA, FLA.—Florida Power & Light Co., McGregor Smith, president, plans erection of a steam plant on St. Johns river to cost $10 million.

TALLAHASSEE, FLA.—City, Robert Parker, mayor, has selected Reynolds, Smith & Hills, Jacksonville, Fla., as engineer for an electric generating plant on the banks of St. Marks river. Cost is estimated at $5 million.

NEW YORK

BUFFALO—Wendling Iron Works, 245 Colorado St., has filed plans with the city to erect a new building estimated to cost $25,000.

BUFFALO—Bryant & Detwiler, Detroit construction company, has been awarded the contract for construction of the main building of the new $35 million Ford Motor Co. plant.

LACKAWANNA, N. Y.—South Buffalo Railway Co., terminal switching line serving the Bethlehem Steel Co. and other industries in the Lackawanna area, will spend about $300,000 to modernize its roundhouse.

NORTH TONAWANDA, N. Y.—Lawless Bros. Container Corp. will erect a building to expand its local facilities. No estimate of the cost of the structure is available.

SYRACUSE, N. Y.—Minbros Construction Co. has announced award of the steel construction for a commercial building at N. Salina street and W. Genesee street to the Bethlehem Steel Co. The structure will cost about $1.5 million.

MONTANA

HELENA, MONT.—City has awarded contract at $129,957 to Rushlight Automatic Sprinkler Co., Portland, Oreg., for first phase of proposed $980,000 water system expansion project.

OHIO

ASHLAND, O.—Union Malleable Mfg. Co. will construct a $64,000 addition to its plant on Virginia avenue.

CLEVELAND—Wayne H. Gunzelman has been named to head an expansion program of Mohawk Foundries Inc., 4758 Warner Rd. Mr. Gunzelman will set up a brass and bronze permanent mold division, and also will supervise the building and organization of a complete metallurgical laboratory.

CLEVELAND—Del Hubman, president of Associated Foundries Inc., 1510 University Rd., and his associates, Walter Pillar and Joseph Svanda, have formed a group called the Delcrafters to make decorative brass and bronze castings for marine use and for the electrical industry. Mr. Pillar is vice president and Mr. Svanda, treasurer.

CLEVELAND—Cleveland Stevedore Co. will start construction of a new $150,000 warehouse building early in 1950 on land adjoining the Main Ave. bridge right-of-way west of the river, site of which has been leased from the Baltimore & Ohio Railroad for 30 years. This building will be followed later by two other and similar buildings. The company handles lakerail shipments of steel, general merchandise and bulk cargoes.

JEFFERSON COUNTY, O.—Ohio Edison Co. is contemplating construction of a $70 million power plant on its Ohio river frontage between Port Homer and Stratton.

LISBON, O.—Don Loch has purchased the business of Heim & Heim Sheet Metal Works. Mr. Loch, associated with the business for several years, will continue to operate the business in the present location on E. Chestnut under the name of Heim Sheet Metal Co., with Edward Heim as an associate in the capacity of technical adviser. He formerly was owner of the business.

MIDDLETOWN, O.—Work will begin Dec. 20 on a $250,000 steel industry plant the Clare Steel Corp. of Detroit will build in Middletown.

WEST VIRGINIA

WEIRTON, W. VA.—Kusic & Haines Mfg. Co., 4040 Main St., is expanding its plant. The plant does job stamping and makes metal parts for diversified industries.

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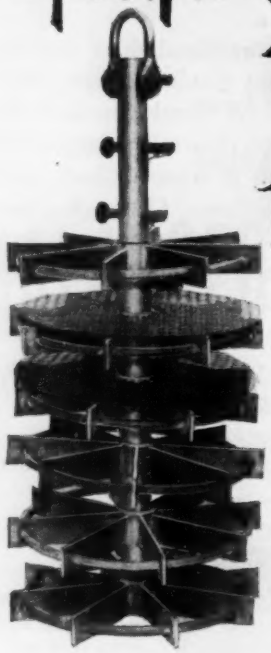

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Made from alloy plate or plate and castings, Stanwood fixtures have great durability, repeatedly withstanding high temperatures, followed by immediate quenching.

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FERROALLOYS

(*Continued from Page 145*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

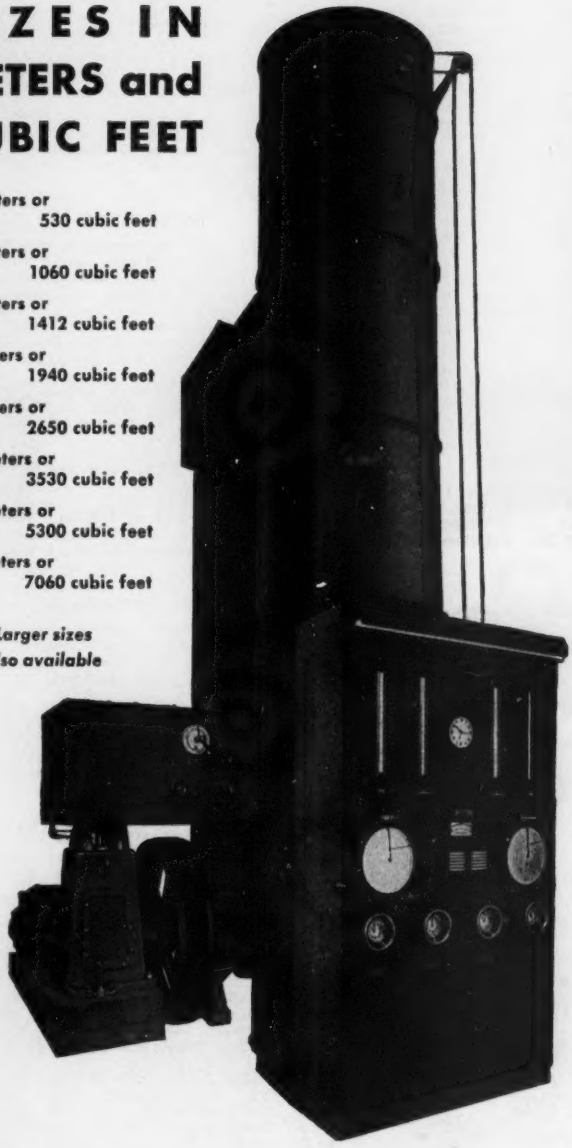
25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Expansion Engine Type Medium Pressure
OXYGEN and NITROGEN
PRODUCING PLANTS

SIZES IN METERS and CUBIC FEET

15 Meters or 530 cubic feet
30 Meters or 1060 cubic feet
40 Meters or 1412 cubic feet
55 Meters or 1940 cubic feet
75 Meters or 2650 cubic feet
100 Meters or 3530 cubic feet
150 Meters or 5300 cubic feet
200 Meters or 7060 cubic feet

Larger sizes also available



Built in standard size as listed above in single and double rectification units. Streamlined panel provides quick visibility of all gauges. Compact design—requires minimum of floor space.

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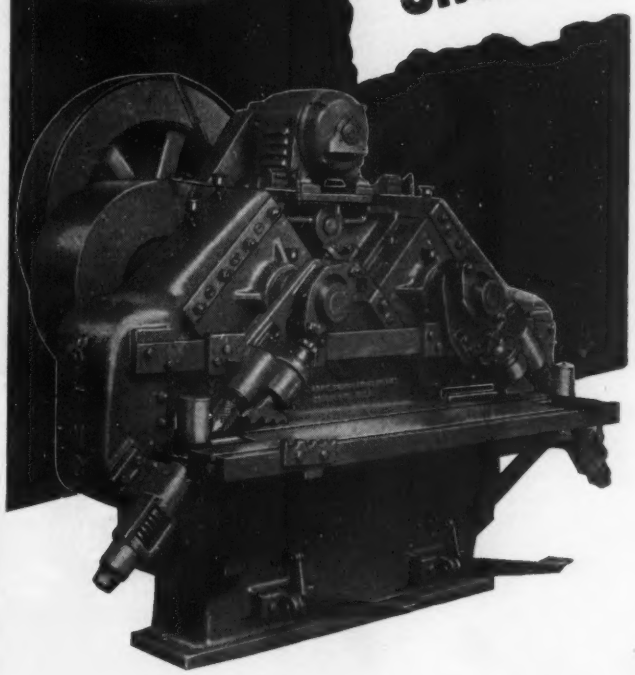

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These special shears are equipped with automatic hold downs and "Y" type roller supports, also a removable guide for flat bar shearing. *Recommended for straight shearing only.* Mitreing can be accomplished by removal of holddowns. Available in four sizes.

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1328S NORTH KOSTNER AVENUE CHICAGO 51, ILLINOIS

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

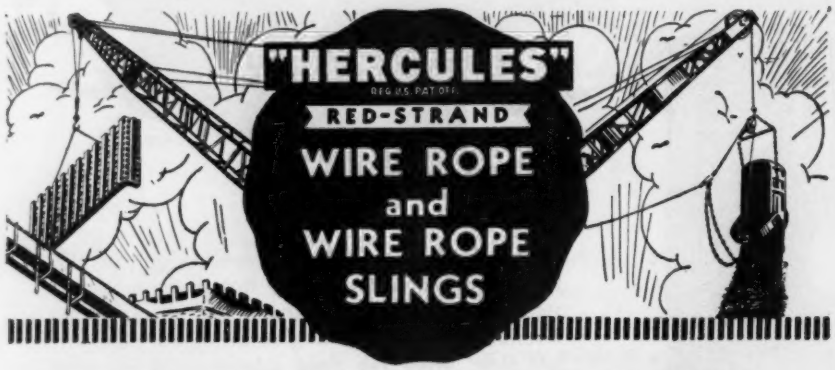
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.



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